A visual interpretation of consciousness as a continuous process of self-organisation and embodiment

by

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I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

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SIGNATURE November 2019

DEDICATION

Dedicated to my Dad and Mom, Tom and Dawn Harvey, who both passed away during the course of the project.

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Abstract

That consciousness is ubiquitous, and relevant to autopoietic self-organisation and embodiment within every living being and/or organism, is a prevalent idea in contemporary consciousness research. However, because ‘consciousness’ as a word is derived from *con* or *cum*, meaning ‘with’ or ‘together’ and *scire*, ‘to know’ or ‘to see’ it infers the experience of knowing with an ‘other’ and/or ‘others’.

The narrative that follows, while expressing a life of its own, documents the interdisciplinary research conducted and questions who and/or to what ‘other’ might infer. My visual diary, *Dust from dust: Microorganisms and other tales: An Artist’s diary,* created as the visual component of a creative practice-as-research undertaking, was silently performed amidst ‘others’ in the Unisa gallery, in an attempt to render visible, the autopoietic, self-organising embodiment essential to the conscious self-developmental component of the project.

Prologue

Once upon a time, I grew bacterial yeast cells in a glass vitrine to observe how they self-organised their own embodiment and photographed the process. At the same time, I conducted interdisciplinary research into consciousness as a self-developmental process, and utilising the cellular symbiosis unfolding in the vitrine as a self-reflexive mirror, came to visualise how indispensable bodily feelings are to conscious self-development, and being-in-the-world-with-others processes.

As a creative-practice-as-research undertaking, I grew, manipulated and photographed the cellular imagery in the vitrine over many years in an attempt to unfold personal bodily feeling associations the imagery held captive, while gathering photographic footage I considered capable of expressing the primordial nature of certain emotive feeling experiences. Once obtained, I choreographed and performed a stop-frame video, entitled *Dust from Dust: Microorganisms and other tales. An artist's diary.* The stop-frame video, along with a catalogue that focuses on the processes engaged with, accompanies the written narrative.

Once edited, I macroscopically projected different phases of the video into a three-walled enclosure in the UNISA Art gallery. The three videos, representing a facet of my praxis, ran concurrently over a two week period. The fourth facet, presented with the video projections to emphasise conscious self-development as an in-the-world-with-others process, was the glass vitrine. It was positioned in a darkened enclosure in the gallery space, opposite the video projections.

This narrative documents how I projected myself into the cellular imagery developing in the glass vitrine, in a way akin to how the ancient alchemists 'projected' themselves into the *prima materia* with which they worked. While the alchemists seemingly worked unconsciously, and my praxis

initially started somewhat unconsciously, the process developed into a conscious attempt to embody the research findings. So, while the video choreographed, champions a microbial cell story, by referring to it as an artist's diary, I emphasise the subjective nature of my praxis as a whole.

In this creative-practice-as-research undertaking, I address the significance of bodily feelings and their relevance to being-in-the-world-with-others processes. In doing so, I aim to offer insight into how and why feelings are essential to inter-subjectivity and/or sociality, self-organisation and conscious self-development, as well as how and why conscious self-development can lead to immersive experiences, which I interpret as embodied adaptation to the rich diversity and/or fullness of life itself.

Key Words

Consciousness, unconscious, being, psyche, self, subjectivity, self-reflexivity, bacterial yeast cells, symbiosis, biological, autopoiesis, primordial-ness, primordial-like, prima materia, alchemy, self/other, subjective/inter-subjective, being-in-the-world-with-others, self-organisation, embodiment, conscious self-development, bodily feeling-intoned experience, immersion, performance.

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For catalogue and the video see:http://bevdelange.co.za

GLOSSARY OF TERMS

- **Affect** – I use this term to refer to subjective bodily feelings and grapple with their significance to the project as a whole throughout the document.
- **Being** – I use this term to reference material existence and/or manifestation.
- **Being-in-the-world** – The German Existential philosopher Martin Heidegger uses the term 'being-in-the-world' or *'Dasein'* to reference the simultaneity of being-in-the-world-with-others processes and I wrestle with this complex insight throughout the document. Heidegger (West, 1996:101) maintains that consciousness is not a detached observer that organises experience, but is personal and inter-subjective. In other words, we only experience the world as involved participants. Merleau-Ponty (Deronne, 1976:243) uses the term 'flesh' or 'flesh of the world' to define the same context and to imply a relationship between consciousness and the body that accounts for what he refers to as the 'primordial unity of humankind and world'. While 'flesh' is Merleau-Ponty's central ontological principal (Weiss, 1981: 89) and his attempt to overcome traditional metaphysical dualisms, in its reference to living materiality, it supports the notion that experiences of unity do not reference fixed identity. Rather, the experience of unity manifests through continuous attempts at achieving balance and/or homoeostasis, because humankind is not reducible to the world, nor the world reducible to humankind, because the two inseparably intertwine.

- **Cognition** – I consider cognition as a broader phenomenon than consciousness, but use it somewhat interchangeably with the term consciousness.
- **Consciousness** – according to Capra and Luisi (2014:257), consciousness unfolds at certain levels of cognitive complexity and requires a brain, and a central nervous system. As such, they understand consciousness as a particular kind of cognitive process that comes into being when cognition achieves a certain level of complexity. The neuroscientist Antonio Damasio (2010:157) understands consciousness as a state of mind with a self-process added to it. Following him, consciousness is a process that, while inseparable from feelings and emotions, pertains to knowing that an object and/or action belongs to the self (Damasio, 1999:27). As no one knows exactly what consciousness is, and while I use the terms 'consciousness' and 'cognition' somewhat interchangeably, I emphasise consciousness as a self-developmental process.
- **Dyad/Dyadic** – two inseparably bound and/or coincident processes of being.
- **Embodiment** - I use embodied and/or embodiment to refer to subjective bodily feelings and/or qualia that can manifest through the assimilation of knowledge and/or increased understanding.
- **Emotions** – in this document, and consistent with Damasio's definition (1999:36), emotions are outward, more publicly directed expressions of inner feeling-toned states.
- **Empathy** – refers to an ability to recognise and identify with how another being/organism thinks and/or feels. I use the term 'being touched' to refer to deep body/mind experiences of inter-subjective interconnectivity.
- **Feeling/s** – refer to inwardly directed, private experiences of emotion.

- **Feelings of life** – translated from Maine de Biran's 1794 *le sentiment de l'existence*, is used in this document to refer to bodily experiences of feelings of life, or the experience of being intimately interconnected within manifest existence itself. (Thompson, 2007:229).
- **Inter-subjectivity** – refers to the inter-relationship between one living being/organism and another. Any experience of deep inter-subjectivity is arguably comparable to immersion as an 'in life' experience.
- **Object** – while also used to infer a mental and/or psychological image, references everyday entities such as a vase, an animal, people, places, a song, a toothache, or a state of bliss.
- **Object that can be known** – refers to the invocation of memory. In other words, use of this terminology suggests that an object of fascination, such as bacterial yeast cells, when explored through extensive research, can lead the subject to increased self-knowledge and embodied consciousness of that knowledge. This, according to Damasio (1999:197) is because, "memory [is] the ability to hold active, over a substantial amount of time, the many 'objects' of the moment: the object being known and the objects whose display constitutes, what he refers to as the autobiographical self". This implies that knowledge of the self is realisable through exploring an object of intense fascination.
- **Psyche** – is used as an umbrella term to incorporate ideas of mind, self, selfhood, spirit, anima, *atman* etc.
- **Praxis** – a process whereby a theory, lesson or skill is practiced, enacted, embodied and/or consciously realised through engaging, applying, exercising, and practising ideas.
- **Processual** – the study of nature as a process, rather than any distinct, discrete event.

- **Qualia** – subjective, sentient experience.
- **Self** – I use the term ‘self’ to differentiate it from the ego, which is regarded as the centre of consciousness only. I suggest that the self is a fluid, developmental faculty of mind and/or psyche capable of self-reflexively seeing both within as well as without.
- **Self-conscious development** – I explore an understanding of self-conscious development by suggesting that all consciousness, is by definition, consciousness of something from which ideas of the ‘self as process’ cannot be excluded.
- **Self-process** – In this thesis, I explore the idea that the self is processual, and when actively engaged, represents a process of endless becoming and/or developing.
- **Self/other** – I use this dyadic ‘paradoxical’ term to delineate a continuous process of sociality and/or inter-subjective engagement.

CHAPTER ONE

Introducing my creative practice-as-research undertaking

In this narrative-styled document I provide a written account of a self-reflexive, creative practice-as-research undertaking, that deliberates on how I consciously self-developed by stepping into my praxis so as to understand my creative processes. I argue that this was partly achieved by growing and contemplatively photographing bacterial yeast cell symbiosis as they developed in a glass vitrine in my studio (see Figure 1), while at the same time researching ideas on consciousness as a living, growing process. A stop-frame video entitled *Dust from dust: Microorganisms and*

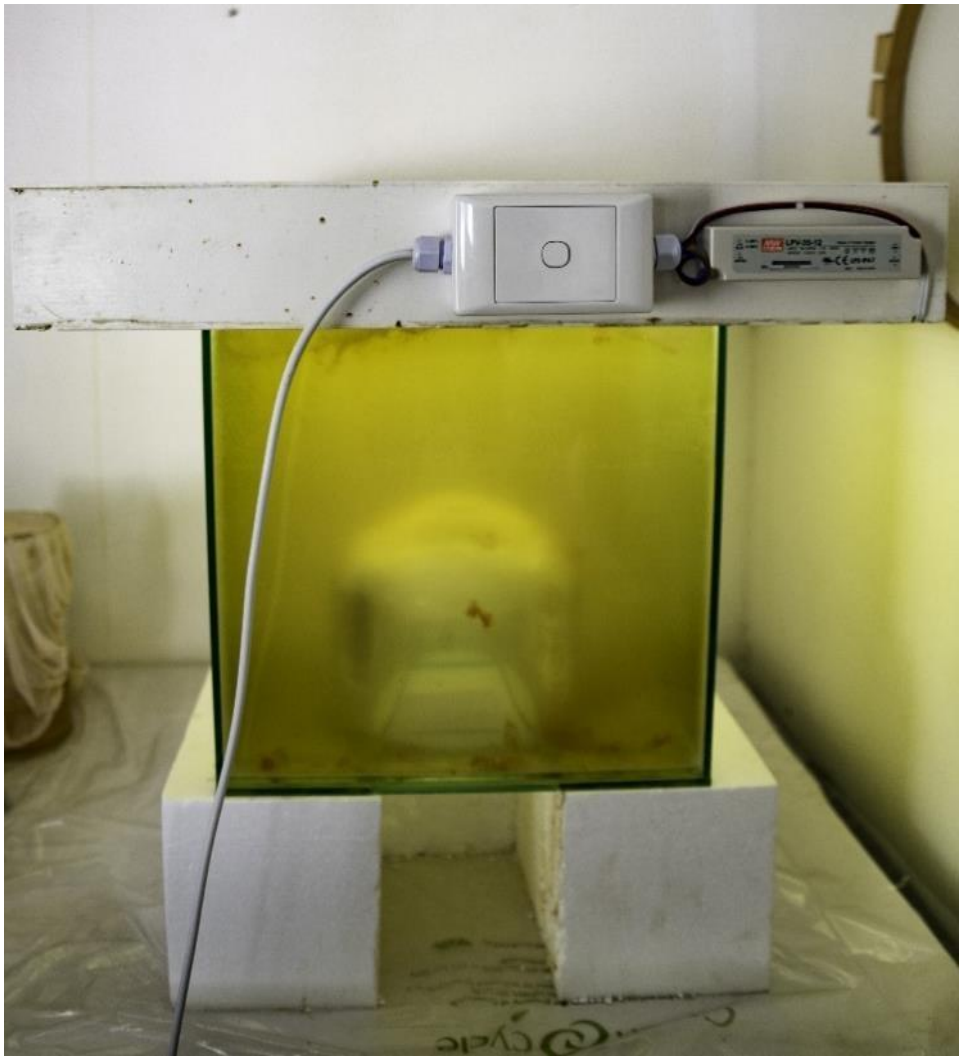

Figure 1. Beverley de Lange. *Glass vitrine with glass dome built into its interior.*

other tales. An artist's diary was choreographed and edited from the photographs taken, as was a catalogue produced, that details my studio praxis.

Generative, creative practice-as-research undertakings, such as the one engaged with, tend to approach research from circulatory, heuristic perspectives, as opposed to the linear structuring favoured by scientific approaches. So while this document is primarily a record of my research endeavours and studio processes, the literature is presented in a continuous stream of information - a literal storm-centre, that when coupled with my studio praxis, allowed new co-ordinates to arise in fresh expressions of life as processual. As such, the project has simply been my attempt at realizing what Richard Shusterman (2006: 7) refers to as "a body at the centre of its vision, its action and its interest."

The approach used aims to open creative-practice-as-research processes, as opposed to closing them down before new insights reach consciousness, while the open-ended and interdisciplinary nature of the project amplified knowledge accretion. Documenting the research also augmented the embodiment of the research process in its entirety.

Because I conducted research into consciousness while experimenting extensively with bacterial yeast cell symbiosis in my studio before delineating the direction of my practice, the preamble to the problem statement and research questions is lengthy. However, in its length, I have attempted to lay a ground plan that should enliven the reader's perception of the project,[1] and is justifiable if it leads the reader to appreciate how the problem statement and research questions arrived at are integral to both the practical and theoretical components of the project.

[1] I use the term 'project' to refer to an imaginative "activity", a "throwing forward of movement to realize [sic] a purpose", as Trevarthen and Delafield-Butt (2017: 3) suggest its Latin origin refers.

The reader will become aware that at times the research meanders into strange, seemingly obsolete research disciplines. This is because I ask old questions and open old boxes in an attempt to gain fresh insights relevant to the meaningfulness and/or meaninglessness of life. As such, the research considers standing questions to achieve novel insight, and anecdotal discernments from many disciplines, including poetry are offered throughout the document in the hope of enlivening the reading experience.

Mostly, the research findings are narrated as a continuous flow of information without any centralised focus, because consciousness is far too complex an issue to offer a unified theoretical standpoint, and to date research findings are neither definitive nor without contradiction. As such, different perspectives are introduced and suggestive titles and phrases punctuate the narration, while the research and processes engaged with are reported without summation until the final chapter synopsis.

I hope that the reader will enjoy this less than usual approach to a creative practice-as-research undertaking, and revel, as I have, at the exciting research insights, together with the flaws, foibles and failures inevitable in an undertaking of this nature. I hope also that between the words, lines, paragraphs and chapters of the document, the reader will experience how journeying beyond oneself, however illusory the concept, still summons notions of a centre or core within finite existence, and how encounters with the solitude, silence and solace of this mysterious, nowhere/everywhere centre, might generate renewed understanding and interest in the life-world we carry within us.

From my Master's project - to the problem statement

Becoming aware of 'biology' as life carried within us began in my Master's project in which I grew simulacra of skin from kombucha pellicles, a near-lichen symbiosis of beneficent non-toxic fission yeast cells and bacterium. I

then used the pellicles to develop a personal visual interpretation of paradox, or the idea that wounding and healing are two sides of one coin. At the same time, I researched the psychologist Carl Jung's interpretation of individuation, which he maintains, involves dyadic unconscious and conscious modalities of mind or 'psyche', and applied his interpretation to my studio praxis.

However, in this creative-practice-as-research project, I shifted the objectives and researched consciousness as an evolutionary process. Research suggests that while consciousness is complex, it also has, according to Lis Nielsen (cited in Hamerhoff et al., 1998:719), a cognitive and emotional aspect that makes it inseparable from self-development as a living interior/exterior process.[2]In other words, by shifting my understanding of consciousness and its relevance to individuation, I researched it as processual, that is; continuously engaged in self-organisation and embodied self-development.

Individuation, following Jung, is primarily a second half of life process (Henderson: 2005, 201). In his writings he makes a clear distinction between the self and the ego, which as the primary focus of Western developmental psychology, only organises the conscious mind of the individual concerned. While the ego is essential to any adaptation to reality,[3] it differs from the 'self', which Jung positions as synonymous with

[2] Daniel Dennett's *From Bacteria to Bach and Back* is a book, that according to Charles Rathkopf (2017: 2) echoes Dan Sperber and Hugo Mercier's recent work in its attempt to show, through the use of phrases such as "symbiotic bacteria in our guts … colonized us long ago, without our awareness", how Dennett's ideas on matter, life, mind, and culture all fit together.

[3] Reality is subjectively constructed.

psyche or soul,[4] because it invokes both conscious and unconscious modalities within an individual's mind.[5]

Differentiating between conscious and unconscious modalities, Jung (1959: 278) designates an 'unconscious mind' to delineate the boundary of an individual's consciousness, which he assumes begins where emotions are generated. Having both personal and collective features, that together cover all psychic contents not conscious to an individual, the unconscious mind is hypothesised to exist because of the 'affects'[6] it generates.

The personal unconscious refers directly to the experiential life world of the individual, while the collective unconscious refers to the phylogenetic or evolutionary reservoir of symbolic knowledge (relational images) potentially available to an individual at given moments in time, because, as Jung (1967:50) asserts, "psyche is image". According to the neuroscientist Antonio Damasio (2018: 99), "feelings accompany the leading imagery of the mind", where he defines 'affect' as a parallel world. Damasio's insights led me to explore the mysterious connection and feeling associations that the bacterial yeast cells in the vitrine held captive for me. Slowly, I came to realise how much they constituted what the psychologist Rosemary Gordon (1993: 159) refers to as "furniture" in an individual's life-world environment.

Julia Kristeva uses the term 'symbolic' to reference all conscious modes of expression, while submitting that "semiotic expressions" originate from

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[4] In traditional philosophy, 'soul' references a spiritual essence or animating principle within every individual being.

[5] One definition of the 'self', following Edinger (1996: 34) is that it is the totality of the psyche, which manifests as a unitary entity. Another is that it represents an individual *psyche* in its wholeness and includes the ego and the totality of the unconscious mind. A third formulation is that the self is both the centre and circumference of the psyche. This definition is consistent with older definitions of God as a circle whose centre is everywhere and whose circumference is nowhere.

[6] I use the term 'affect' to refer to qualia and/or bodily feeling associations.

within the unconscious aspect of an individual's mind, which, like Jung, she confirms is an invisible reservoir of desires, tensions, energies, and repressions, not usually present to consciousness. She argues also that conscious/unconscious expressions are not entirely separable, and whereas we use symbolic modes to state everyday positions, these same positions can become unsettled by semiotic drives (McAfee, 2004: 2 & 17).

According to Lacan, cited in Oliver (1997: xiv), because the symbolic is the element of signification that sets up the structures by which symbols operate, it is the most important period of early childhood development, in which the child developmentally breaks from the mother to become aligned with the father as lawgiver. A woman's role during this time is to support the paternal law and promote the will or 'law of the father'. The child must learn this law because "woman is [only] biology" - to be cast aside so that "man [can] represent the law" (Blackwell, 1999: 317 & 319).

While Kristeva acknowledges that entrance into the 'law of the father' (symbolic law) is painfully enacted through the loss of the pre-oedipal mother, she counters Lacan, arguing that splitting the subject from the 'mother' never amounts to total severance, because semiotic drives persist in the *chora,*[7] (Ellis, 2017: 451), an unfathomable space of generation and negation for the subject, a "sacred space" of becoming, of circulation and revolving, dancing movement.

According to Giles Deleuze and Felix Guattari (cited in Ellis, 2017: 448), "…there is no system of signs common to all strata" and arguably different confluences continuously come into view, converging and diverging in the ongoing processes of life. In this sense, they propose a philosophical

[7] Kristeva, cites Plato's notion of *chora* as receptacle, using *chora* to denote a space prior to symbolisation that references a subject in process.

language of “assemblages with strata of signification facing other strata of signification in multiple directions simultaneously.”

Kristeva contends that the *chora* (unconscious mind) remains active at the borders of the self (i.e., between psyche and soma), between the law-before-the-law and the maternal law. However, the gender theorist Judith Butler argues that ‘paternal’ law is responsible for generating desire in the form of natural drives (Ellis, 2012: 447, 448 & 453), an insight that suggests that drives can manifest through conflicted emotional feelings. This perspective informed how I set about realising a personal or individuated space, achievable with “artist’s labour” (Whitehead, 2017:1) and following Ellis (2017: 451), argue that experiences of an individuated space of being, and by extension immersive experiences, can manifest once conflict between subjective masculine/feminine drives are resolved.

Lacan’s theory, which has implications for subjective/inter-subjective development, it is not unpacked further, because in Kristeva’s view, and those of other theorists, I found support for my understanding of subjectivity and consciousness as a self-developmental process. In particular Kristeva produces productive insight into how identity is wrought in ways unrecognised by the subject and she challenges ideas that suggest that self and other can ever be clearly demarcated (McAfee, 2004: 76).

Her writings offer insight into movement between conscious/unconscious, symbolic and/or semiotic, law of the father and/or knowledge of biological processes and her writings were deemed relevant to my attempt at developing a visual analogy that reflected simultaneity between the biological and cultural worlds we inhabit. Because, as Timothy Morton reminds us (2010: 87), “[t]he strange stranger is not just the ‘other’ – the ‘self’ is this other”.

In my Master's project, I focused on Jung's interpretation of thinking, feeling, intuition, and sensation, which he considers four psychological functions necessary for conscious self-development, and in the praxis[8] engaged with personal, affective[9] emotional feelings evoked by the Kombucha symbiosis[10] growing in plastic containers on the floor of my studio. In other words, during the course of the Master's project that preceded this Doctoral project, I initiated a process of consciously 'imaging' the affective associations embedded in the kombucha medium, and using Jungian insights to guide my understanding of the psychological processes of individuation, developed signifiers of wounding and healing as a paradox, or two facets of a dynamic dyad.

However, in this project I decided to develop the viscous, glue-like associations the bacterial yeast cells evoke as a visual analogue for self-conscious development that supports subjective being-in-the-world[11] because we are always immersed with other beings-in-the-world. I developed the visceral associations not only to prompt the evolution of my thoughts on consciousness as a self-organising, self-developmental process, but to incorporate the necessity for caring for all beings/organisms - right down to bedrock – the strata of the single cell, which as the smallest

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[8] The term praxis refers to a process in which a theory, lesson or skill is enacted, embodied and/or realized. It can also refer to acts of engagement, application, and exercising, realizing, and/or practicing ideas. I specifically initiated my studio praxis to prompt movement of my ideas.

[9] There are many different conceptions of the affective body with Jung's interpretation only one of them. Affect, the neuroscientist Antonio Damasio maintains, is a biological agent of survival and adaptation. For Henri Bergson, affect is memory which, however complex, supports the body through unremembered processes and for Gilles Deleuze, affect is a relay between the "other" and ones' own body, between two moments in time, between the "no longer" and the "not yet" (Marie-Louise Angerer, 2011: 225).

[10] Kombucha, as mediatory medium in my praxis, is discussed in detail later in the project.

[11] Heidegger coined the term being-in-the-world to mean a structure that is primordially and constantly whole while simultaneously being-with-others (West, 1996: 101&102). Following Ellis (2011: 2) Heidegger makes it clear that our ontological 'throwness', the 'there' of every individual being, means that no individual being can place him or herself over or against the world, because 'world' is the horizon against which every unique existence is always already related.

entity known to self-organize, has its origins, according to the biochemist Franklin Harold (2014: 13 & 16), in the origins of life.

I use the term ‘affective’ to reference both feelings and emotions as two sides of a dynamic dyad, but consider emotions the outward expression of inner, subjective feeling experiences, and argue for feelings as experiential bodily affects that alert the organism to the problem emotions have identified. According to Damasio (1999:284), emotions, feelings and consciousness are all interrelated within an individual’s body, and this subtle differentiation between emotions and feelings is important, because unlike emotional expressions, bodily feelings are experienced on the interior of the subject’s body, and contribute towards individuation, subjectivity and/or conscious self-development (Damasio, 2018: 152). They achieve this through the multiplicity of images aggregated around events as banal as the memory of a toothache, or as ecstatic as a state of bliss.

Heidegger criticises the view that neglects feelings and emotions, because, according to philosopher Matthew Ratcliffe (2002: 287), in traditional philosophy, they are primarily argued to be ‘psychical’ or ‘accompanying phenomena’. While Damasio contends that the ground of ‘being’ is a feeling continuum, a biological choir capable of continuously structuring and re-structuring an individual’s psychological foundation. As he puts it (2018: 100), “[t]here is no *being* […] without a spontaneous mental experience of life, a feeling of existence.”

Three very significant insights at this juncture that influenced how I proceeded with my studio praxis were Reason’s contention that “[w]e do not suppress our primary subjective experience” (cited in Mäkelä and Nimkulrat, 2018: 20); Pico’s observation that, “from the first cell to the human body, the internal milieu remains the most stable four dimensional context” (Pico, 2002:304) and London’s (2003: x1) thesis expressed as

follows: “Inner, outer. First mind, final mind. Art, we call these ways art.” These writers were significant if we consider that in Jung’s writings, he emphasises how much ‘psyche’ is an imaginal structure, “an experience in images […] of images” (1959:38) and I applied these understandings when developing my praxis.

Jung also confirms that individuation is a continuous process of psychological becoming, and that feelings are rational biological functions capable of circumnavigating a psychological imago,[12] but do so using the oppositional dynamics of projection and/or introjection.[13] While being complex biological processes, projection and/or introjection are regarded as psychological mechanisms capable of promoting, however rudimentarily and/or unconsciously, the re-organisation of an individual beings life-world environment to achieve balance and homeostasis.

According to Jung (Jacobi, 1968:92), everything that is unconscious to an individual is projected outwards (objectified), and only through conscious self-development are contents of the unconscious mind detached from the object and integrated into the *psyche* of the developing individual/organism. As a biological process, introjection and projection assist the

[12] In biological terminology, imago references the final stage an insect attains during its processes of growth, development and metamorphosis, and in this project I use the term to designate what I consider a more complete stage of conscious self-development.

[13] Introjection is a psychological defence mechanism involving the appropriation of an external happening and its assimilation by the individual personality – making it a part of the self (Stedman’s Medical Dictionary, 1990, sv ‘introjection’). Jung (1962: 566) regards introjection as “an indrawing” of the object into the subjective circle of personal interest. The philosopher Martin Heidegger (Thompson, 2007: 225) uses the term “inbeing” to reference the way a living being is ‘in’ its life world and the processes of selfhood and sense making that, follwoing him, are the precursors to the embodiment of consciousness and/or self-consciousness. Projection refers a sensation to the object producing it. It is both a psychological defence mechanism by which a repressed complex in the individual is referred to another person, as well as the conception by consciousness of a mental occurrence belonging to the self as being of external origin (Stedman’s Medical Dictionary, 1990, sv ‘projection’). Following Jung (1962: 566), projection is the “transveying of a subjective content into an object”.

individual/organism categorise life-world experiences as pleasant or painful, comfortable or uncomfortable.

However, while feelings of pleasure or pain categorise subjective experiences, like emotions they are bi-valent bodily signifiers, constituting a dynamic within the consciousness of the individual experiencing them.[14] When projected beyond an individual onto an 'other',[15] which happens in early developmental processes, they exert little influence on conscious self-development [16] However when introjected, which Jung (1962:566) describes as the 'indrawing' of an object into the subject's circle of interest, it is possible for amplified self-development to occur and for the individual to become conscious of the self-developmental processes they are undergoing.

Gordon (1993:159) affirms that self-organising dynamics are 'bi-valent' and/or dyadic biological signifiers that are comprised of a psychic-spiritual pole and a somatic-biological-instinctive pole. This bi-valent dynamic exists throughout nature to facilitate movement and balanced psychological development and represents the means for continuous self-organisation

[14] Jung (1976: 205) writes that "consciousness is always in danger of being led astray by its own light and of becoming a rootless will o' the wisp, longing for the healing power of nature's deep wells of being and unconscious communion with life itself - in all its innumerable forms."

[15] Projection beyond the individual onto an "other" can take many forms and religious projections are only an example. Many institutions and/or organisations with whom individuals associate themselves also inform identity.

[16] As a process of 'becoming' or self-development, individuation is not only described by Jung but by theorists as diverse as Arthur Schopenhauer, Gilles Deleuze, Friedrich Nietzsche, Henri Bergson and David Bohm, amongst others.

within an individual beings 'psycho logos, [17] because it facilitates harmonisation within a given life-world environment.

This causal and hierarchical model of being, structured as it is through dynamics such as one/many, us/them, man/women, earth/heaven, unconscious/conscious, self/other etc, has informed the thinking pattern of Western societies for several thousand years and according to Deleuze and Gauttari (2008: xv & 3), represents a way of thinking that can only be understood by becoming, or consciously experiencing, the 'other' within the dynamic. As the analytical psychologist Eric Neumann (1973: 104) comments, "experience of the world is only possible through opposites."

That consciousness constitutes a dynamic of nature that emerges with twin roots is confirmed by the psychologist Zoltan Torey (2009:7). However, according to him, only one of the roots, which he calls 'baseline awareness', is continuous up and down the evolutionary ladder. While such awareness seemingly infers an organism's "ability to guide movement to sustain a coherent 'self' in its world" (Trevarthen & Delafield-Butt, 2017: 2), for Gustovo Gomez Perez (2013: 4), following Merleau-Ponty, the idea of a biological 'baseline' presupposes a "silent field of possibilities".

Consciousness researcher Daniel Dennett (1993: 24) also considers consciousness a phenomenon with an elaborate biological base, while reminding us that values like love or money are borne along on the culture, and therefore not inherent to the biological base of consciousness. According to Torey, 'baseline awareness' provides the sensory information about what is going on within and without the organism concerned, because it represents a bedrock capable of assisting subjective adaptation and grounding an individual in his/her life-world, which is a process

[17] Logos is a Western term derived from Greek and used in philosophy, psychology, rhetoric and religion to reference ground, word, reason, discourse, order, and knowledge, amongst other inferences.

arguably comparable to the means whereby a plant adapts over time to the environment in which it is planted. My attempts at understanding how this process proceeds and how bacteria in our body are fundamental to such a process, led me deeper into the interdisciplinary research conducted.

Because Torey contends that primordial feelings arise from 'baseline awareness', (Gordon's somatic-biological-instinctual pole) and Damasio's 'protoself' (1999: 22), primordial feelings reference a locus of 'sensory totalisation' (Torey, 2009:7). In other words, primordial feelings refer to a locus of sensations that inform what is happening within and without the organism concerned and this insight inspired me to visually manipulate the bacterial yeast cells and create an analogy of 'baseline awareness' as the site of self-conscious development. From this site of bubbling inner-feeling experiences, I then attempted to update and re-imprint my imaginal, psychological canvas, using the more contemporary understandings gained.

According to Torey (2009: 7) we share this ability to a lesser or greater degree with all beings that have brains, because the human brain is only an extended version of the same cognitive processes that preceded it in evolution. What we do not share, 'however', is the supplementary neural faculty that allows us to access and internally manipulate the canvas as we reflect on it, as I have done in this project.

I have done so because, while science continues to map every corner of the human brain and hold paramount the idea that thinking is superior to sentient perceptiveness, terms like 'self', *psyche,* mind, anima, atman, etc. become increasingly meaningless in a world that positions the ego as the crest of the wave, *sum qui non*, of conscious self-development. This superior positioning of the ego is further troubled in patriarchal ideologies, where aggressive capitalism and narcissism hold hegemony over notions

of ‘others’ in-the-world. The singer/songwriter Glen Frey critiques the ego on his album *Strange Weather* (1992), with the lyric “I’ve got mine, I’ve got mine I don’t want a thing to change ‘[c]ause I’ve got mine. I’ve got mine.”

According to systems theorists Fritjof Capra and Luigi Luisi (2014:256), ideas about coming into consciousness of the wholeness of psyche as a living, self-organising dynamic, belongs to the oldest and deepest intuitions of humanity. They also contend that until quite recently, the idea of a self-organising universe was unusual in science, which in favouring rational, objective approaches to knowledge, failed to recognise the material world as a network of inseparably entangled patterns of transformations that all contribute, whether consciously or unconsciously, positively or negatively, to the collectiveness of psyche as a biological process.

As Shaun Gallagher explains (2007: 686) “[w]e do science when we are conscious.” This reference presupposes first-person consciousness of the subject making the statement. Can investigations into consciousness be other than from a first-person perspective? Can a feeling-intoned experience be reported by someone other than the person experiencing them? As complexity theorists Robin Robertson, Allan Combs and Michael Bűtz amongst many others, suggest “consciousness and changes to consciousness, whether individual or collective, are often turbulent and chaotic and only recently have psychologists begun to apply the insights of complexity theory and/or non-linear dynamics to psychology” (Bűtz, 1995: 331-332).

While I discuss complexity theory in greater depth later in the document, it suffices to mention that Bűtz (1995: 331) considers human beings capable of articulating experiences of change from within. Capable of recognising that chaos feels like “a confused unorganized state of primordial matter”, even while the turmoil itself connotes self-organisation out of the chaos

through a step-by-step process that is capable of leadingowards a more adapted and complex level of functioning.

According to Morton (2010: 95), failure to recognise patterns of transformation in nature are central to current debates on ecological collapse which, amongst other factors, is attributed to the still pervasive dualistic ideology attributed to the mathematician and philosopher René Descartes (1595 – 1650), whose famous 17th century dictum 'cogito ergo sum' – declared 'I think therefore I am', supreme. A dictum that implies that the true self is a mind not a body, a thinking thing - never a physical thing.

Descartes' dictum divided the universe into *res cogitans,* thinking substances, and *res extensa,* the mechanical world, and according to Stuart Kauffman, the latter, including Isaac Newton, won the day. Kauffman continues (2015: 1) that in objective science since then, "we have literally lost our mind – and hence our humanity" as a consequence of the conceptual separation of the mind from the body, where bodily feelings are considered incapable of taking part in the great project of the modern era and of furthering 'human' knowledge in any way (McAfee, 2004: 81). As Kauffman continues, despite Charles Darwin's theories, biologists remain children of Newton and continue to dream of a grand, epistemologically complete theory that will allow lawful entailment of the evolution of the biosphere. Such a dream, according to him, is no longer tenable (cited in Asselin et al., 2008: 227), and while one is seldom capable of seeing or perceiving life as a whole, it is necessary to recognise that scientists live in the self-same world we are all trying to comprehend.

According to Mark Johnson (2006: 48), non-dualist's who consider the separation of mind and body a mistake, because it pre-supposes that the mind and body require yoking together, also need to reframe the problem. They need to do so, according to Johnson, by questioning not so much

how two different metaphysical substances interact, but how characteristics usually attributed to mind, such as the ability to conceptualise, reason and understand, to know and to will, emerge from invisible physical processes.

According to Jung (1968: 17), religions caste such processes as the work of an ‘imprinter’, yet science, asserting autonomy from religious paradigms, has till now remained dismissive of religious symbolism, arguing it away as generally incomprehensible. According to Johnson, the most popular ‘non-dualistic’ approach to the problem is to explain everything through nature, with no reference to anything supernatural that affects nature from beyond itself.

This is reasonable if we include biological processes hypothesised to exist beyond the visible frame of everyday Newtonian physics in the debate, because contemporary consciousness research suggests such processes are capable of leading conscious self-development. It is also necessary, if, like Kristeva (McAfee, 2004: 109 & 118), we agree that existence suffers from a withering of psychic space a “neglect of soul” (Jung cited in Schödinger, 1967: 129) ‘or as Jung puts it’(cited in Dourley, 2011, 526) loss of a “living continuity with the ground of consciousness.” Kristeva advises that it is imperative for every individual to keep his/her own unique ‘inner zone’ alive and dynamic. This idea is supported by Gilles Deleuze Felix Guattari, whose theories rely on metaphysics of process as opposed to product (Patton, 2010: 19). Deleuze and Guattari utilize their conception of the ‘rhizome’ (Sutton & Martin-Jones, 2008: 8 & 124) to introduce the term ‘rhizomatic thinking’, an approach that addresses current imbalances in our interactions with ‘others’ and represents a principle for self- organisation and action that takes into account how we ‘think’, as representive of our mode of being-in-the-world.

According to the philosopher Baruch Spinoza - there is only one unitary substance, which he refers to as Nature or God, and the body/mind entity, merely a manifestation of this substance (Johnson, 2006: 50). While working from within the Western metaphysical tradition, Spinoza contends that the nature of the mind/body depends on its capacity to affect or be affected, to move and be moved. In other words, Spinoza concedes that human affect plays a role in informing bodily valences of pleasure, pain and/or suffering (Lapworth, 2015:91). Jung agrees, adding that (1962:628) "[w]e should not pretend to understand the world only by the intellect; [because] we apprehend it just as much by feeling". Insights such as these continuously supported my praxis.

Cartesian dualism has long been criticised for forwarding a conception of the world that separates the individual body from its mind, and the soul from its spirit, rather than yoking them together. Pointers which reproach Descartes for positioning 'thinking' as a superior 'mind' process, an idea that led to the conceptual separation of the feeling function of conscious development from its thinking function. This subversive inaccuracy supports aggressive capitalistic ideologies within patriarchal models of being.

Centering the act of thought arguably instigated the progressive sublimation of feelings, which in turn disrupted the deep inter-connections between ourselves as nature and/or psyche as a physiological whole. As this individualistic mode of being-in-the-world continues to gather momentum, various projections, regardless of the form in which they manifest, increase, widening the chasm between humanity and nature. While Morton (2010: 60) argues that reading poetry won't save the planet, that only hard science and progressive social policies can do that, art seemingly represents an avenue through which we might glimpse the

nature of ‘being’, beyond the normal, familiar categories to which we are accustomed. As Schrödinger explains (1967: 137).

> The world is given to me only once, not one existing and one perceived. Subject and object are only one. The barrier between them cannot be said to have broken down as a result of recent experience in the physical sciences, for this barrier does not exist.

I grappled with these ideas while trying to ascertain how the psychological chasm created by Descartes’ dualistic ideology thwarts subjective feeling experience of immersion into being and/or psyche. Because as the post-human theorist Rosi Braidotti suggests (2013:68-69), "even the animal has become the necessary, familiar and much appreciated ‘other’ for humankind, providing a social grammar of virtues for humankind to observe".[18] Braidotti, at pains to express the depth of this loss of sentience, quotes the female poet George Eliot’s verse

> [i]f we had a keen vision for all ordinary life, it would be like hearing the grass grow and the squirrel’s heart beat and we should die of the hoar lying just the other side of silence (Braidotti, 2013: 55).

As Descartes’ dualism societally embedded itself, it initiated resilient gender divisions, sustained by patriarchal structures all projecting gendered notions of god as male or father.[19] While only a symbolic reference in patriarchal paradigms, my project challenges this hierarchical

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[18] While postmodern feminist theory rejects unitary identities indexed on a Eurocentric normative humanist ideal of ‘Man’, Rosi Braidotti (2013:27, 28) argues that in a “political economy of difference”, entire categories of beings have been overlooked because they are considered less valuable and therefore dispensable.

[19] Early recordings of mythopoeic ancestry used gender to discern patterns in nature, where they considered the earth feminine and the sky masculine. However, they recognised also that earth and sky came together to touch in a libidinous [dyadic] union (Beverley Zabriskie cited in Barnaby & D’Ancierno, 1990: 267-270).

structure of being, where ‘maleness’ is often seamlessly aligned with thinking and/or rationality and ‘femaleness’ with the feeling function, the male counterpart, ‘other’ or ‘second sex’ as the existential feminist Simone de Beauvoir (2019) asserts.[20] I have done so by manipulating genderless microbes that while perceived as insignificant, are recognised as inseparable from life processes, never male, female, or other.

The theorist Helen Fielding (1996:176) agrees that we are indebted to post structuralism for breaking up the static way we understand things, such as how the gendered subject is produced through language, culture and psycho-sexual effects, and agrees that the body of experience, the phenomenal body as she refers to it, has been sacrificed. This is because body/mind dualism implies that “I can be who I am without a body”, because by inaugurating a psychological division, mind became projected beyond the individual, either religiously or in secular capacities and the self endorsed as a mental construction - accidentally physical (David West, 2006:12, 13).

However, Marie-Louise Von Franz (1980:34-36) argues that we cannot relate to the world without projection, because it is an essential component within the dynamics of ‘being’ itself. Projections assist subjective differentiation and, supported by Jung’s contention (1959: 230) “division is true within the sphere of consciousness” her insight supported my intention to project the manipulated yeast cell imagery in a performance in a gallery. Von Franz affirms ‘projection’ to be an essential ingredient in conscious self-development, but adds that within every projection there is also subjective feeling status that allows an individual to feel whether certain projections fit - or feel that it is no longer valid.

[20] De Beauvoir famously declared that woman are not born women, they become women.

Schalk Gerber and Willem Van der Merwe (2016:2) affirm this where they argue that Descartes' dualistic system of thought is inadequate to describe or understand the processes of being. They suggest (following philosophers Jean-Luc Nancy and Phillipe Lacoue-Labarthe), that we *"*recognize that which completes itself (and does not cease to complete itself)" as representative of enlightened discourse, arguing that such discourse is capable of re-appropriating man in his/her humanity.

Yet while opposition to Cartesian dualism prevails, little seemingly changes in capitalist hegemonies. However, by refering to certain bodily experiences as *"feelings of existence",* the 18th century French philosopher Maine de Biran challenged Descartes' conception of a soul separate from the body. In suggesting that feelings of existence arise from within an individual's own psyche, de Biran's writings support the idea that because mind is conditioned from within patriarchal paradigms it was important to step backwards to regain perspective. Taking such steps was also supported by Jan Patočka (cited in Thompson 2007:229), who convincingly argues also that an 'I' is indeed only possible in a biological organism capable of moving on its own.

The aims and objectives of the research process

When embarking on this creative-practice-as-research project, I had already conducted research into ideas of consciousness as a self-sustaining network and was able, following Harold (2014: 221) to realise it as chemical activity capable of aggregating matter and energy to itself, constructing a boundary, achieving the capacity to reproduce itself, while evolving towards greater efficiency, complexity, and autonomy. I was encouraged in this realisation by Heidegger's proposition that 'being-in-the-world' is simultaneously 'being-with-others' and Nancy's explication of "[b]eing as a 'co-existence'; always a case of being-with, where the 'with' is

not subordinate to the notion of Being" (Welch & Panelli, 350). As such, I positioned the bacterial yeast cell symbiosis (kombucha) as a bio-medium capable of expressing consciousness as a self-dynamic that self-organises its own embodiment, and attempted to give visual expression to Heidegger's paradoxical insight that 'here' (within me) is simultaneously 'there' (within an 'other)[21].

As the bacterial yeast cells grew, I manipulated and photographed their self-reorganising processes, with the intention of using the photographs to choreograph and edit a stop-frame video, which once accomplished, I entitled *Dust from dust: Microorganisms and other tales. An artist's diary.* The video, along with the vitrine, was then 'performed' at the Unisa Art Gallery in 2018 as the practical outcome of insights gained from a creative practice-as-research project.

While the aforementioned objectives were my aims and intentions of the project, because creative practice-as-research projects tend to take convoluted pathways as new knowledge and understandings emerge, it became necessary to find suitable theoretical and methodological frameworks to yoke the practical and theoretical components of the project together. Complexity theory provided a theoretical framework, while Hans-Georg Gadamer's interpretation of the Greek *theoria* and *theoros,* or contemplation and participation, provided a methodological approach that ensured that rather than just writing about conscious self-developmental processes, my praxis might prompt subjective 'conscious' embodiment of the research findings.

As such, I entered into a process Gadamer refers to as *poeisis*, which he considers an authentic process of integration capable of 'making present' a

[21] I discuss this further in the section in the literature review that briefly explores Heidegger's contention that being-in-the-world is simultaneously being-with-others.

greater understanding of myself as processual, in order to achieve new self-understandings of humanity as processual (Gadamer, 1981: 149). According to Gadamer (1981: 92) “no learned and mastered technique can spare us the task of deliberation and decision”, demanded by ‘*poeisis’*. Davey (2006:37), re-iterating Gadamer, emphasises that conscious embodiment requires active, engaged, contemplation such as the process engaged with in my studio, as such undertakings help liberate research from the rigidity of scientific approaches (particularly relevant in the arts and humanities) because they allow the artist to unfold subjective meanings held captive by the object/s of contemplation. As such, *poeisis*, or ‘making present’ arises because of the practice and remains relative to the practice.

Needless to say, this interdisciplinary practice-as-research undertaking was my subjective attempt to open up my praxis by becoming conscious of my art making processes and practice from inside myself. It was also about opening up to experiences of alternative modes or strata of being-in-the-world, amidst other-beings-in-the-world. While necessary to philosophise my approach, the project primarily involved active *‘doing’* as the means for achieving understandings from within myself.

These ideas were supported by Manning and Massumi (cited in Mills, 2015: 2), whose writing’s offer insight into how to bring experiences of perception back into relational terms, because they argue that experiences of “body” always relate to an “other” body. Their arguments suggest that different discourses and approaches to knowledge (as I have attempted to illustrate in this project) can live side-by-side without necessitating the prioritisation of one idea over another.

Their insights facilitated how I developed a subjective visual interpretation of consciousness as a continuous biological process of self-organisation,

implicated in self-development, and how I constructed a practical/theoretical 'milieu' from which the reader might appreciate an interpretation of immersion. Their insights also supported how I developed a personal understanding of being as a 'receptacle' of nature, an invisible 'space' potentially apprehended from within the subject or organism in question.

As such, following what Nancy designates the waning of the modern presupposition that the world can be possessed by an object, panorama, or scene entirely visible to an ideal or absolute spectator' (cited in Ludevine Asselin et al., 2008: 151), my praxis became about developing an idea of 'world as a milieu', a world in which each individual being is capable of finding itself. As Asselin et al. explain, "[w]e are in the world, not in front of it", and performing the stop-frame video *Dust from dust: Microorganisms and other tales. An Artists diary,* was my attempt at addressing how we think about consciousness as a self-developmental being-in-the-world-with-others process.

Specific aims and objectives of the research process

The aims and objectives of this project are grouped into two sections. The first addresses the specific objectives of my practice, while the second focuses on the specific theoretical objectives. The contents of the twin aspects of this creative-practice-as-research undertaking overlap and inform one another and are only separated to organise and identify the different tasks undertaken. While I considered the objectives of my studio practice capable of facilitating the realisation of the problem statement and research questions posed, the theoretical objectives, which follow the practical objectives, supported my studio praxis as the project unfolded and came together.

In the practice

- Grow yeast cells into cellular agglutinations to give visual expression to conscious self-development, that while relevant to subjective self-organisation, feels inter-subjective at its core.

- Manipulate and photograph the cellular networks while contemplatively/meditatively engaging with subjective feeling associations provoked by the primordial nature of the imagery.

- Develop a stop-frame video from individual photographs taken of the yeast cell agglutinations self-organising their own embodiment.

- Perform the stop-frame video along with the vitrine and still photographs in an art gallery in an innovative revisiting of the idea of a personal and/or artist's diary.

- Configure the vitrine in which the yeast cells were grown, manipulated and photographed as a critical element in the performance of my practice in its reification of self-reflexive conscious development inseparable from being-in-the-world-with-others processes.

In the theory

- Research consciousness as a feeling-toned dynamic capable of guiding self-organisation and the subjective embodiment of knowledge.

- Research homeostasis as a physiological imperative within every living organism and/or being, guided by oppositional bodily affects such as feelings of pleasure or pain, comfort or discomfort, however rudimentary such affects may be in primitive organisms.

- Position the symbiotic agglutinations as biological correlates for conscious self-development and subjective/inter-subjective experiences.
- Record in a narrative-style document the practical and theoretical research undertaken in the project and the insights gained from a creative practice-as-research undertaking as a whole.

Research design and methodology

Having identified Gadamer's interpretation of *theoria* and *theoros* as a methodological approach capable of yoking the practical and theoretical components of the project together, my praxis became about developing signifiers of personal self-organisation, and the relationship self-organisation shares with conscious self-development and 'feelings of existence'.

While the terms *theoria* and *theoros* (contemplation and participation), engaged mediation with the yeast cell process through the glass of the vitrine in which they were growing brought me face-to-face with what Donna Haraway refers to as 'companion species'. Haraway's 'companion species' refers to dogs, but my studio, the companion species was/is bacterial yeast cells (*schizosaccharomyces pombe*).[22] However, over time and through research, I came to understand just how much microbial[23] life is a 'companion species', and how they are a symbiotic part of all of us and all our environments, all of the time.

This engaged 'turn to practice' is in line with philosophical and cultural ideas, and the performance of the stop-frame video, developed from

[22] *Schizosaccharromyces pombe* is also referred to as 'fission yeast'.
[23] I use this term to reference micro-organisms such as bacteria and yeast cells capable of causing disease and/or fermentation.

symbiotic aggregations of yeast cells, is arguably evocative of the vicissitudes of consciousness as it develops through visual oppositions such as dark/light, opacity/clarity, green/red, microscopic/macroscopic, amongst other oppositions. As such, my self-reflexive studio praxis developed around the subjective attempt to tell a new kind of story, drawing on Deleuze and Guatarri's notion of a 'rhizome'. In this way I came to realise how the psychosomatic functioning of the unconscious image, however mysterious and uncanny a process, can, over time, give rise to ideas that slowly embody themselves. As Stephen Jones writes (cited in Allegue et al. 2009: 24):

> performance's attention to the uncanny provides a distinct way of accessing the beyond of knowledge and the everyday [and] that which appears and most affects us about it is precisely those aspect of the everyday that we do not recognize and cannot phrase, that which can only be felt uncannily of the everyday.

While in the chapter on methodology, I fully discuss my bioartistic praxis from within a creative practice-as-research paradigm, it is important to point out that creative practice-as-research projects are sub-divisible into practice-led and/or practice-based research. I discuss the differences below and explain my decision to use the term creative practice-as-research for this project.

Practice-based and/or practice-led

Following Linda Candy (2006: 1) if the creative 'object' (she uses the term artefact) is the basis of the contribution to knowledge, the research is practice based. If the research primarily leads to new understandings about practice, it is practice led.

Graeme Sullivan suggests that practice-based researchers are attracted to the definition of ‘research’ in the *Frascati Manual,* because this introduces creativity as a significant feature of the research process. According to Sullivan (2010: 74), the *Frascati Manual* is often cited in research policy documents, where it describes research as “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humankind, culture and society, and the use of this stock of knowledge to devise new application”, as was the goal with this project.

Maarit Mäkela and Nithikul Nimkularat (2018: 1) contend that practice-led research projects require the practitioner, who is also the researcher, to document and consciously reflect on the creative processes of the research topic. This is because the artefacts produced are not always capable of communicating all the knowledge of the research process, where it remains necessary for some interpretation of the artefact/artefacts to take place.

Probing how the artefacts of practice-led research can interact with theoretical knowledge to create new knowledge, new ways of doing research and new points of view, Scrivener and Chapman (cited in Mäkelä, 2007:159-163), suggest that focusing on the issue at hand allows the developing artefact to unfold abstract perceptions. In other words, active engagement and contemplative participation can actually summon insights and ignite perceptions in the individual practitioner potentially precipitating a cascade of thoughts, intuitions, and sentient feeling experiences that lead conscious self-development. Practice-led research is thus characterised by focusing on issues and perceptions held captive by the object being explored, which once researched, manifest as new understanding in and through the artefact created (Mäkelä, 2007: 157-159). As such, the artefact produced by an artist-researcher is recognised as a method of collecting and preserving information and understanding.

Angerer (2011:219) explains how the subject is the basis of the insight and knowledge an artwork contains, suggesting that practitioners submit themselves to transformation via the media with which they work, because in this way, the artefact reifies conscious self-developmental knowledge and creative emotionality, and the artwork produced/performed becomes capable of opening the subject, as opposed to closing the subject down.

Deliberating on these insights, I realised how both practice-led and practice-based research approaches contained ideas relevant to my art-making processes and the performance of the stop-frame video *Dust from Dust: Microorganisms and other tales. An artist's diary.* I realised also, that while I stood 'outside' the glass vitrine, peering seemingly into 'a glass darkly', the video choreographed, edited, and performed was inseparable from the vitrine through which I self-reflexively acquired insight and knowledge. Appreciating this, I settled on the umbrella term 'creative practice-as-research' or simply 'practice-as-research' to accentuate how the 'video as artefact' embodies the knowledge researched and how the video and vitrine performed together might contribute to new understandings about artistic practices.

Borgdorff (cited in Sullivan, 2010: 78-79) suggests that practice-as-research explicitly implies that artistic practice is an essential component of both the research process and the research results, and according to him:

> Art practice qualifies as research if its purpose is to expand our knowledge and understanding by conducting an original investigation in and through art objects and creative processes. Art research begins by addressing questions pertinent in the research context and in the art world. Researchers employ experimental and hermeneutic methods that reveal and articulate the tacit knowledge that is situated and embodied in specific artworks and artistic processes. Research processes and outcomes are documented and disseminated in an appropriate manner to the research community and the wider public.

Borgdorff's statement informed the methodological approach of the project, while complexity theory provided the theoretical framework, and together they yoked my studio practice to the literature researched. I discuss complexity theory separately under the research premise.

The central theme of the project

Having researched at the outset of this project how visual signifiers in the artworks of Louise Bourgeois contain psychosomatic (symbolic) elements from her life-world experiences, I applied the insights to my studio praxis. As Gordon re-iterates (1993: 159) living symbols require the 'furniture' of an individual's material world to convey meaning and point beyond themselves to the universal.

Bourgeois' life story is complex and not further discussed in this document, but her 'cell' series, and its focus on biomorphic performances, summon to mind the idea of 'identity as selfhood' (Samson, 2008: 383) and the unfolding of consciousness through self-developmental processes. Specifically, her artwork entitled *Destruction of the Father, Reconstruction of the Father,* which suggests she experientially recognised bodily 'feelings of existence', and reified them in her art-making processes.

In suggesting that "[e]ach art aims to represent what is unrepresentable … [because] if represented […] [it] would bring into existence a different kind of sensation", Elizabeth Grosz (2008: 81) questions how an artwork wrenches sensation or affect from its materiality. She questions how an artwork captures sensations within it as it simultaneously emerges into consciousness, while mapping a degree of human understanding of our inhuman counterparts, and does so, according to her, by enabling chaos to appear as sensation, or as intensity, without ever imperilling or overwhelming the subject in question (Grosz, 2008: 60-61).

Applying these insights to my studio practice, together with the insights gleaned from earlier research into Bourgeois' art works, I set about re-envisioning my understanding of consciousness, not as something unattainable and set apart, but as a self-developmental process. This re-envisioning went hand-in-hand with the symbiotic aggregations in the vitrine in my studio, and once set in motion, I used the biomorphic imagery unfolding in front of me as a self-reflexive mirror and manipulated, photographed and eventually choreographed and edited the photographs into a stop-frame video, that I present as an artist's diary.

The practice as a whole increased my understanding of why certain bodily feelings have an immersive, '*feelings of existence'* quality to them and while my praxis remains inseparably linked to contemporary consciousness research, through embracing an interdisciplinary approach to the undertaking, I covered a lot of research in disparate research disciplines and came to consider such an inter-disciplinary approach essential to 'opening boxes' and/or 'thinking out of the box'.

Needless to say, the approach contributed to the many complexities encountered in an undertaking of this nature, especially when the research engages with consciousness as subjective '*feelings of existence'* experiences. As Morton explains (2010: 29), the 'glue' that upholds life exists as both the centre and the edge, even as we come to an understanding that there is no centre and no edge. This is because

> the surfaces of living beings are [both] envelopes and filters… [b]iochemistry is only just beginning to discover the precise mechanisms of photosynthesis and the transfer of nutrients across the placenta to the embryo [while] [t]he interfaces involved host countless parasites and symbionts. At a microlevel, it becomes impossible to tell whether the mishmash of replicating entities are rebels or parasites [as] inside-outside distinctions break down (Morton, 2010: 36).

However, for Heidegger, being-in-the-world is simultaneously being-with-others. This is supported by Nancy, whose insights, together with those of Heidegger are briefly discussed in the literature review. A critique which helps explain how and why self/other dynamics assist in differentiating opposites such as inside/outside, visible/invisible, human/non-human, within/without, microscopic/macroscopic etc. amongst the myriad binary oppositions inherent in all bodily/material/biological/organic processes. As the analytical psychologist Neumann re-iterates (1973: 104) the "experience of the world is only possible through opposites."

Throughout my praxis, I remained conscious that having been raised in a religious environment, educated for the most part in Catholic schools, trained as a nurse, midwife and medical/surgical theatre sister (an environment that influenced my understanding of life processes), would influence my studio praxis, because as Matthew Reason explains (cited in Makela and Nimkulrat, 2018: 20)

> [w]e do not suppress our primary subjective experience […] [but] we accept that our knowing is from a perspective; […] we are aware of the perspective and of its bias, and we [attempt] to articulate it in our communications. Critical subjectivity involves a self-reflexive attention to the ground on which one is standing.

However, I considered my praxis a constructive means of renewing my 'spiritual' point of reference and anticipated that performing the stop-frame video in a gallery setting would consciously amplify embodiment of the knowledge researched. Knowledge of how much all of 'nature' is within all of us, all of the time and how its processes, while far from fully understood, deserve our greatest respect.

The research premise

Researching consciousness from a first-person perspective is complex, and at a certain point in the project it became necessary to gather the diverse disciplines of research under a unifying umbrella. Complexity theory provided this umbrella. As Ali Cambel (1993: xi) comments:

> complexity is ubiquitous. It is in nature and in artifice. It appears in large and in small systems. It can be tangible or intangible. To be aware of complexity can be like feeling a 'presence' that virtually defies description.

However, according to Ewa Bobrowska (2018: 62), every work of art should aim to free itself of all other purposes, except exposition and presentation, so that what is produced is being, presence and participation, and in many ways, this is what I attempted to achieve. In this sense Nancy also distances works of art from economic constraints or their value, as commodities circulating in a world market as, according to him, works of art always herald fresh beginnings and in this sense this project represents an endeavour to come to new and greater understanding, because following Nancy, works of art arguably represent new understanding and consciousness of self-development.

Complexity theory as theoretical framework

Complexity theory, also referred to as chaos theory or non-linear dynamical systems theory, is the study of how complex processes unfold over time, and a theory I considered capable of yoking the diverse interdisciplinary research conducted in this project as a praxis. It was also necessary because as John Gribbin explains (2004: 136 - 137) "[a] complex system is just a system that is made up of several simpler components interacting with one another […] [but] [t]he simple pieces have to be connected in the

right way, so that they interact with one another to produce something greater than the sum of its parts". That, he continues, is "complexity founded on deep simplicity". Jude Currivan affirms (2017: 138) that self-organising complexity is readily found in biological organisms and ecosystems, as well as in collective social and economic systems.

One of the great paradoxes of complexity, however, is that between the orderly deterministic nature of Newtonian (scientific) laws and the chance events occurring all around us in all aspects of our experience, is the realisation that scientific laws are not really as deterministic or categorical as science would have us believe (Cambel, 1993: 2). This insight should encourage a rich vein of research into the humanities, as we plot our way forward into troubled landscapes confused by ever-expanding knowledge.

Robin Robertson and Allan Combs (1995: 17) suggest that ideas embedded in complexity theory are very relevant to our changing vision (consciousness) in the world. A changing vision and consciousness that signifies a shift from the controlled clockwork machine-like vision of Newtonian physics [24] that considers science capable of explaining everything to an ecological vision of how life evolved and keeps evolving on the planet as a collective whole. This suggests no less than a coming together of science and spirituality, because what it implies is that everything is interconnected and everything evolves together.

[24] Although still providing explanations that have relevance on the human scale, Newton's concept of reality cannot explain the fundamental nature of reality. This is apparent because in quantum physics the moment one looks at atoms and sub-atomic particles only quantum physical laws apply and whereas Newton's laws are deterministic, in quantum physics the physical laws are not deterministic - only probabilistic. Because of this, we cannot determine exactly what happens in the quantum realm and many of its secrets remain beyond our present grasp and/or understanding. For this reason I elected to present the research, which deals with notions of self-consciousness, as an artist's diary.

Complexity theorists Steven Guastello et al. (2009: 23) liken complex systems to large mosaic tableaus, made up of myriad separate ceramic shards, somewhat like the interdisciplinary approach of this document. Individually the shards have little significance in and of themselves, but when correctly configured the entire mosaic is capable of drawing the spectator into the intersecting pieces as the whole image manifests as a *gestalt.*[25]

According to Paul van Geet (cited in Guastello et al. 2009: 245) living organisms are assemblages of closely interdependent components, whose collective activity transcends the sum of their individual parts. In other words, living organisms are non-linear, self-organising entities just as capable of creating and re-creating their own structure and organisation from the interactions of their different parts, as is *psyche*, a body/mind/soul entity, capable of self-organising itself. However, to fully understand such a system, including its growth and development, it is impossible to detach it from the inherent complexity that underlies the structure that informs how it develops.

As such, complexity science/theory represents a meta-paradigm which traverses many disciplines including physics, mathematics, biology, the social sciences, psychology and/or psychotherapy, philosophy, biophilosophy, biopolitics, and posthuman philosophy, amongst other disciplines of research. According to Franco Orsucci (2016: vii- ix), '*complexity'* requires an open handbook, as a closed one would represent a misleading knowledge strategy in our complex, non-linear landscapes. He argues that most of the work is about facilitating the mind's own natural self-organisation, which is an insight that inspired this transformative and/or 'generative' self-developmental process (Haigh, 2014:49-51). According to

[25] A psychological term, also used in visual theory, to refer to the whole when perceived as more than the sum of its parts.

Jonathan Delafield and Colwyn Trevarthen (2015: 12), generative learning ‘is found to be ‘invariant’ across development, from simple motor capacities in a young foetus, through pre-verbal proto-conversation in infancy, and into linguistic meaning-making in childhood and later life.

According to Martin Haigh, transformative learning expands consciousness by involving critical reappraisal that facilitates fundamental change in both self-concept and worldview. However, Orsucci (2016: 4) cautions that complexity lies at the edge of chaos, even while he offers that it is a flexible dynamic capable of self-organising criticality by balancing randomness and order in healthy living systems. Stated differently, complex systems naturally evolve towards a phase transition at the edge of chaos (John Gribbin 2004: 184).

The insights of complexity science supported how I documented my praxis and literature researched, as to date there is no final word on consciousness as a self-developmental dynamic that self-organises its own embodiment. By providing a framework that combined the diverse interdisciplinary research to the practical undertakings in my studio, it supported the integration of new and ancient knowledge. So, even while the research of the project seems disparate, complexity theory offered a way of seeing how, over time, humanity has continuously preoccupied itself in the construction of narratives capable of assisting self-harmonisation and the construction of meaning in life.

According to Roland Barthes (1977: 123-124), the purpose of a narrative is not to ‘represent’, but to constitute a manifestation very enigmatic to us. Franco Orsucci (2016: 7) confirms that humanity has long occupied itself with exploring possible continuities between being and becoming, while Grosz (2008: 3 & 8) supports the idea that art is more about the affect

produced by the artwork than about what is presented and/or performed. She explains:

> [p]hilosophy, like art and like science, draws on and over chaos […] in order to give life to sensation that, disconnected from its origins or any destination or reception, maintains its connections with the infinite it expresses and from which it is drawn.

Central problem question

How and in what ways bacterial yeast cells grown in a vitrine in an artist's studio can be contemplated, manipulated, photographed, choreographed and edited into a stop-frame video, that when performed along with the vitrine representing the artist's self-reflexive mirror, provoke an idea of the 'primordial-ness' of feelings of immersion as a 'being-in-the-world-with-others' experience.

Research Question 1:

How, and to what degree can such contemplation and choreography of microbial cells be visually used to evoke self-organising behaviour as a process inherent within nature that is capable of guiding living beings towards adaptation and embodiment?

Research Question 2:

Can a performance of the stop-frame video *Dust from Dust: Microorganisms and other tales: An artist's diary*, together with the vitrine used to grow the microbial cells in my studio, as well as still images and flat television screen footage of the video, evoke a light/dark, visible/invisible, self/other, subjective/inter-subjective, microscopic/macroscopic interface capable of communicating the curiously paradoxical feelings associated with immersive experiences?

Research Question 3:

As a creative practice-as-research approach to art-making, is positioning the stop-frame video as a personal diary a resonating means of performing an idea of the subjective nature of conscious self-development?

Research Question 4:

How can I use the glass vitrine with its interior symbiosis (scoby[26]) to provoke the idea that 'being-in-the-world' is inseparable from being-with-others-in-the-world?

SCOPE AND LIMITATIONS OF THE RESEARCH

While my research and praxis is documented as a stream of information without beginning or ending, I separately detail the scope and limitations of both the practice and the theory, even while they overlap. It is appropriate 'however' to highlight how the practical/theoretical subtheme provides an interesting parallel for another dyadic dynamic, such as conscious/unconscious, visible/invisible, self/other, subjective/inter-subjective, microscopic/macroscopic etc. and how, even while informed by complexity theory, the way in which these are interconnected proved very challenging given the subjective nature of the project. This was because documenting a subjective process seemingly required that I step outside the project to reflect on it as I write, even as I stepped into it and immersed myself within it to achieve the outcomes. Attempting to delineate or 'collapse' the understandings gained into past, present and/or future tense, reminded me of the conundrum Edinger (1996: 34) grapples with when trying to delineate the 'self' from a Jungian perspective:

> [t]here is a logical problem in all of this, because when the Self is defined as the totality of the psyche, the totality includes the ego.

[26] SCOBY is an acronym for symbiotic culture of bacterial yeast.

> How can the ego, a mere part of the whole, stand separate and speak of the totality as though it were something separate from itself?

While Edinger concedes that paradox is built into the human psyche, and the phenomenon of consciousness, he explains (from what I consider a somewhat patriarchal perspective) that it is as though the ego, as son, takes over some of the qualities of the Self, as father.[27]

Scope and limitations in the practice

- Only grow yeast cells into symbiotic networks to establish a visual relationship between their primordial-like comfort-seeking behaviour and consciousness as a subjective self-developmental, feeling-toned process, at times experienced as immersion into being itself.

- Only focus on photographing the yeast cell symbiosis in the vitrine to develop a primordial feeling-toned narrative that reflects comfort-seeking and self-organisation as aspects of conscious self-development.

- Because it is never possible to repeat any photographic sequences exactly, once manipulated, photographed, choreographed and edited, the stop-frame video represents a once-off first-person account of ongoing engagement with yeast cell symbiosis and many years of practical and theoretical research, collapsed into a few minutes of time.

- I manipulated and photographed thousands of images of the cellular symbiosis, then choreographed, edited and installed a visual performance and in the documentation emphasise that the processes

[27] I highlight the self-reflexive nature of my praxis throughout the text and draw specific attention to the idea of art as a medium pertinent to self-reflexive engagement, in the section ‘In my studio’ in Chapter Three.

engaged with helped reify the knowledge researched, while the narrative-style of the video relies on imaginative, subjective interpretation.

- Because ancient alchemy represents a vast and complex arena of historical knowledge, it was only possible to focus on pertinent insights from research that helped me to explore the work as an unconscious process unwittingly promoting conscious self-development.

Scope and Limitations in the theory

- Any comprehensive explanation of how either personal consciousness or the collective unconsciousness impacts on the development of consciousness falls outside the scope of the project.
- As no one has arrived at a comprehensive understanding of exactly what consciousness is, or how it works, any comprehensive overview of the biology of consciousness as a self-developmental process falls outside the scope of the project.
- Research into the neuroscience behind feeling-toned signifiers capable of promoting conscious self-development falls outside the scope of the project.
- Evaluating personal feeling signifiers as either negative or positive, pleasant or painful, comfortable or uncomfortable, does not form part of the research of the project.
- While the importance of religious/cultural practices in nurturing societal values and social cohesion is not irrelevant to the processes engaged with, assessing the relevance falls outside the scope of the practice.

- Explaining why feelings of empathy and compassion manifest together with primordial feelings, while also not irrelevant, falls outside the scope of the project.

Project Assumptions

Having experimented with differing methods and possibilities, I was reasonably confident of being able to manipulate the kombucha pellicles,[28] and photograph, choreograph and edit a stop-frame video from photographs of manipulated symbiosis. When witnessing the comfort-seeking yeast cell symbiosis, I was optimistic about achieving visual signifiers capable of reflecting personal self-organisation and embodiment and of iterating how comfort-seeking and self-organisation are inherent process within nature and/or being, that support how living beings navigate their social environments.

Using aggregations of cellular symbiosis as analogues for comfort seeking, self-organisation and embodiment, I anticipated that the video, when projected macroscopically into a three-walled enclosure in a gallery space, might reflect ideas engaged with in a visually accessible way. Because *Dust from dust. Microorganisms and other tales* is also '*An artist's diary',* positioning the vitrine used to acquire the video footage within the exhibition space, was considered essential to the performance of subjectivity and the continuity of being-in-the-world-with others processes. At the same time the vitrine, as a self-reflexive mirror, represented what Butler (cited in Asselin et al., 2008: 5) refer to as "openness to resignification and recontextualisation."

[28] Pellicle is the biological term given to the thin skin, cuticle, membrane, or film that forms on the surface of the kombucha liquid as a consequence of the yeast cell symbiosis.

CHAPTER TWO

Literature review

Introducing literature that tells a new kind of story

'*We need new stories',* was the theme inscribed on the cover of the 2019 Edinburgh International Book Festival hand-out, and it inspired how I went about documenting the binary nature of this research undertaking. Regardless of how complex things appear, everything coheres in "deep simplicity" (Gribben, 2004: 137) and "harmonic order" (Jude Currivan, 2017: 102).

I was equally inspired by John Peter Berger's epigraph "[n]ever again will a single story be told as though it is the only one" in Arundhati Roy's controversial novel 'The God of small things'. However, only when introduced to the biophilosophical writings of Donna Haraway's '*When species meet',* did I realize the significance of performing, together with the yeast cells, a new kind of story. A story that portrays companionship, as also self-companionship, amidst the complexities of life in this 'brave new world' as Harold refers (2014: 229).

As already mentioned, in my studio practice I engaged with the bacterial yeast cell processes and manipulated and photographed them as they grew and developed in my attempt to 'make visual' a subjective interpretation of consciousness as a self-organising, self-developmental process. At the same time, I grappled with Elizabeth Grosz's contention (2008: 40 & 47) that "species cannot be understood […] separable from the milieu in which they find themselves" and the significance this insight has for subjective self-organisation. Because Grotz' suggests, that milieu are at all times involved in a kind of coevolution, her contention seemingly agrees

with Robertson & Combs' proposal mentioned earlier (1995: 17) "that everything is interconnected and everything evolves together."

In '*When species meet',* Haraway specifically addresses how human beings might become companions to *'*others*'* in the environment. While Haraway's apt turn of phrase specifically references dogs, her insights contributed to how I edited the stop-frame video into an artist's diary that speaks of companionship as also self-companionship. While ideas of kinship with beings similar in size to humans is not new, it is arguably easier to appreciate, than feelings of companionship with invisible microbes. However, creating my diary represented an opportunity for the bacterial yeast cells to dance their evolutionary story, while at the same time a subjective metaxy, in which I attempt to marry notions of 'species companionship' to conscious self-development.

This is just about where the review of the literature researched to create a visual diary of microscopic/macroscopic, conscious/unconscious, self/other, self-development begins. Yet it is not '*The'* beginning, only where a beginning begins to begin, and as it has no ending, the interdisciplinary literature documented simply leads the reader without summation through the methodology of my studio praxis and on to the concluding chapter. Along the way, I continuously add anecdotal insights gleaned during the research undertaking and do so, not only to support the literature presented in the review, but to maintain the dynamic stream of information approach and retain something of the dyadic theme underlying the project as a whole.

However, because the reader is also the observer of the silent video *Dust from dust: Microorganisms and other tales. An artist's diary*, he/she is asked to keep an open mind when reading the flow of information presented in subsections – while listening to their own heartbeat. A

heartbeat invested in the restoration of nature, all of nature, invested in an ‘apocatastasis’, derived as it is from the Greek verb ‘restore’, which according to Jung (1968: 306) “extends to non-human creation in general, […] await[ing] [restoration] like the merely natural man.”

My diary opens

As already mentioned, when embarking on this creative practice-as-research project, I recognised that religiously I still retained somewhat anthropomorphic, human-centred ideas and projections, as though the psychological structuring of my mind still echoed my earliest moments of spiritual education. However, during the course of the project, I came to realise and assimilate how much of a void or black hole exists at the centre of nature, and to acknowledge how this void exists within every living, being including myself (Morton, 2010: 80).

As the project developed into a praxis it provided a means of psychologically disentangling myself from obsolete hierarchical associations and/or categorisations and of re-invigorating my spirit with non-anthropocentric, processual understandings of life. While developing imagery capable of supporting the knowledge gleaned from the research was a means of doing so, I was, at times, encouraged in this conscious transmogrification by the poetry (below) of Rainer Maria Rilke (1875-1926). Rilke urges us to achieve the greatest consciousness of our existence which he claims is at home and inexhaustibly nourished by both unbounded realms that is; the conscious and unconscious mind (Silverman, 2009: 9).

> It fills us, we arrange it. It collapses. Who’s turned us around like this, so that we always, do what we may, retain the attitude of someone who is departing? Just as he, on the last hill, that shows

> him all his valley, for the last time will turn and stop and linger, we live our lives forever taking leave (cited in Guastello et al., 2009: 23).

At this point in my praxis I had come to an understanding of Jan Patočka's comment (cited in Thompson, 2007: 364), that an 'I' is only possible in a biological organism capable of moving on its own, and his references to "the dynamic of constant attraction and repulsion", "e-motion" and/or "impressional affectivity". Having read that Aristotle BCE384-322BCE, who deliberated extensively on the unity of life and soul (Thompson, 2007: 226) never ventured into discussions of his own body from a subjective perspective, even while he considered the soul material and entirely relevant to the organism's differentiated activites, I became interested in how Descartes (1596-1650), whose philosophy has its precedents in late Aristotelian philosophy, meditated on mind/body processes, only to conceptualise the body as separate from the mind:

> I think, hence I exist; nay I am that very thinking mind, that thinking. But that mind, that thought, springs either from itself or from something else. On the latter alternative, from what does that something else come? (Descartes, 1967: 4).

Yet even while I grappled with many complex biological insights, my praxis was not so much about discussing my body, but about exploring bodily feelings and developing a visual analogue for consciousness as bubbling *feelings of existence* arising into consciousness. However, according to Damasio (1994:251-252), the idea of body, as separate from mind, still pervades research and practice, and is a mode of being-in-the-world that continues to obscure the roots of the human mind in biologically complex, fragile, finite, and unique organisms. A separation that is evident in how Western medicine considers psychological illnesses different from bodily diseases, as though the mind were outside the body. For this reason,

Damasio proposes that the model from which the Western understanding of *psyche* is derived is flawed, and he cautions that if we fail to recognise the uniqueness of conscious existence, we are less concerned and have less respect for the value of life in the here and now

As the indicators for psychological illnesses rise, amidst a plethora of associated maladies, Damasio urges us to address *psyche* from an organismic perspective and to re-model our conception of being from nonphysical cognition to cognition of biological tissue relative to the whole organism and its interactions in its physical and social environments, that is, relative to its interactions within *psyche* as a nature/nurture continuum. Essentially, Damasio is asking for no less than a marriage between science and the humanities, or science and mankind's knowledge of him/herself as Gadamer refers (1981:149), because as researcher, Ania Krajewska reminds us (2014:27) "debate about the compatibility of the humanities and the sciences is rendered marginal, when the individual in culture is revealed as having a biological centre."

Needless to say, remodelling or re-conceiving ideas about being an individual amidst being-in-the-world-with-others processes requires conscious and unconscious modalities of psyche, because a key aspect of 'self-evolution' involves the balancing of twin forces/influences and/or dynamics and is a bodily process (Damasio, 1999:224). This, according to Torey (2009:151) is because the body owns and uses the mind, not the other way round. While Torey affirms (2009: 4) that the individual mind is self-evolving, he offers that the conscious mind's identity is to be found in the self-organising processes that enable the human brain to model it's modelling. However, the individual mind is only the means for promoting what the universe is about, what Torey explains as "the singularity's struggle to achieve self-reconstitution and oneness" (2009: 201).

Torey's insights suggests that every individual mind and/or psyche is capable of self-interpreting its self-developmental and/or growth processes and of achieving recognition of itself as materially one and continuous with the biosphere and/or universe. This is because the term 'universe' does not reference an order or 'other' superimposed on matter, but rather a process that has evolved out of it, to become its own organisational focus and point of reference, from which further evolution and development is possible (Torey, 2009: 201). As Torey puts it, once the mind has evolved past its 'identity crisis' it can recognise itself as real and neurofunctionally anchored within both itself and the outside world. The beauty of this, according to him, is that any apparent reduction of the 'spiritual mind' to the physical/biological organ itself is no reduction at all rather, it presages a vantage point that looks out onto an ever-widening horizon.

Questioning what exactly identity and its relationship to the term 'self' means, the neuroscientist, Vilayanur Ramachandran (2004:96) puts forward five characteristics of 'self' , listing the first as 'continuity', or the sense that an unbroken thread runs through the entire fabric of our experiences, accompanied by awareness of the past, present and future. The second characteristic is 'unity' or 'coherence', so that despite the diversity of sensory experiences, memories, beliefs and thoughts, we experience ourselves as individual subjects. Third is 'embodiment' or a sense of ownership, where we experience ourselves as anchored within our own bodies. Fourth, is a sense of 'agency' or 'free will', in charge of our actions and destinies, and fifth, and most elusive of all, is that by its very nature, the self is self-reflexive, that is, capable of reflecting on and being aware of itself.

Yet, according to Damasio (2018:149, 159), if we are really to understand how consciousness and/or self-consciousness/reflexivity happens, we must first understand how identity is constructed, and while he acknowledges

consciousness as a process, not a 'thing', he endorses two critical ingredients. These are the building of a perspective for the images in an individual's mind, and an accompanying feeling valence for the images. This is what I set out to achieve in my praxis. According to Damasio (1999: 312), such ingredients are necessary because "consciousness *feels* like a feeling". It feels like some kind of pattern assimilating itself from the non-verbal signage of body states, where perhaps for this reason, the mysterious source of first-person perspectives (Damasio's 'core' consciousness), is a sense of self revealed to the organism in a way that is powerful, yet elusive, vague, yet unmistakable.

The Nobel Laureate, Romain Rollard (cited in Silverman, 2009:124-125), uses the term "oceanic" to refer to the type of feelings Damasio describes. He suggests, that the sentience of the bodily experience informs the individual that he/she is part of an unbounded whole. Rollard positions certain feeling experiences in much the same way that the Heidegger (mentioned in chapter one) positions 'being' when arguing that 'being-in-the-world' is simultaneously 'being-with-others'. Sigmund Freud contends that such feeling experiences are "primitive ego-feelings". [29] The anthropologist Lucien Levy-Bruhl uses the term "participation mystique" to describe what he contends are primitive memories, arising from within an individual's own mind (Jung, 1977:488). Jung (1977: 463) uses the term *mysterium coniunctionis* to reference how the alchemist's described their processes.

Merleau-Ponty (Deronne, 1976: 57, 59) suggests that we experience feelings of unity through the body because the body reveals the world to consciousness – as the body lives in direct contact with the world. Merleau-Ponty uses the term 'flesh' to reference his central ontological principal

[29] Damasio (1999: 304) supports Freud's contention by claiming that consciousness is the outcome of a rigorous connection between what he refers to as 'unconscious proto-responses, which following Whitehead, remain untranslatable other than in created terms.

(Weiss, 1981: 89) to overcome traditional metaphysical dualisms. Because ‘flesh’ infers living, growing materiality it supports the proposition that experiences of unity cannot reference fixed identity, because humankind is not reducible to the world, nor the world reducible to humankind, as the two are inseparably intertwined.

In my praxis I grappled with unfolding, in a visually accessible way, complex insights such as these. However, I was motivated by Whitehead’s suggestion (2017: 2-3) that artists are capable of embodying and uncovering artistic sensation embedded in mundane consciousness, and that art-making processes are potentially capable of transmogrifying feeling perceptions into objects and ideas into a practice. This is because art is concerned with communicating internalised responses to outward reality, responses, which according to Whitehead remain untranslatable other than in created terms.

Following Whitehead I examined Plato’s concept of anamnesis (428/27 – 348/47 BCE), a concept that implies that humans possess innate knowledge that can be summoned into consciousness through erudite education. Education that includes creative practice-as-research undertakings, because as the sociologist philosopher, Jean-Francois Lyotard (2004:107) continues, anamnesis helps makes present what we have forgotten. In other words, while a process guided by the unknown represents a process, that through engagement with unpredictability and invisibility, is capable of summoning into consciousness, knowledge already within ourselves. “A being in incompletion”, as Weiss refers (1981: 88) “delineated as a world - only through the praxis and thought of the situated subject.”

Even while my theoretical research continued without pause, the bacterial yeast cells continued growing apace in the vitrine in my studio, and I continued feeding, nurturing, manipulating and photographing the cellular

symbiosis, and the moment-by-moment formations of gossamer-like membranes (pellicles) forming on the surface of the kombucha liquid.

Yet, following to Penrose, Hameroff and Kak (cited in Pandarakalam, n.d: 46), we cannot define consciousness, only describe 'it'; and in such moments, I decided to see and view myself in and through microbial cells. I conceptualised (subjectively envisaged) the cell's interior/exterior homeostasis as analogous to my consciousness, my self-development. As the artist and theorist Jim Mooney suggests (cited in Macleod & Holdridge, 2006: 142)

> [t]here are moments in time when the surface of the body and the surface of the art work elide, become one and what is [inscribed] on the surface of the work, is simultaneously being inscribed on the surface of the [artist's] body'. In this way a work of art emerges and we too are changed; in a very important sense, art becomes us.

Damasio explains (2018: 157) that between the sensing irritability of single cells and plants on the one hand, and mental states of consciousness on the other, there is a long physiological and evolutionary expanse, but this does not mean the processes are unrelated. Rather, he suggests, between the phenomena of cellular sensing as a basic level of consciousness, and mental faculties in the full blossoming of the term, 'feelings' occupy a critical, intermediate state of being, and do so, because they are dyadic and/or valenced signifiers constitutive of the core mental state of the body to which consciousness inheres. When such feeling-intoned states permeate an individual's life in the here and now, it summons a subjectivity capable of driving creativity (Damasio, 2018: 158).

Damasio admits that while he had not deemed it necessary to communicate the significance of feelings in earlier writings, it is now imperative for him to introduce 'primordial feelings' as critical elements in the self-process. This is imperative, because primordial feelings precede all

other feelings and arise through interaction between a specific object and a specific organism. He writes:

> [t]he feeling tells me, without a word being spoken, that I own the objects […] that I can act on them if I wish to do so […] that my own body exists […] independently of any objects […] as rock solid, wordless affirmation that I am alive (2010:185).

This suggests that the primordial nature of the feelings, as mysterious and alluring as they are, infer a confluence between the knower and the known and perhaps there are few experiences that can match such a feeling. As Albert Einstein notes (cited in Capra & Luisi, 2014:278):

> [t]he fairest thing we can experience is the mysterious. The fundamental emotion which stands at the cradle of true art and true science […] the mystery of the eternity of life […]

Merleau-Ponty (Parry, 2011:169) also emphasises the body as the most influential of existential contexts, the primordial signifier of the only world we can subjectively know or reflect on when he writes

> [t]he body is not the intermediary between the world and consciousness […] [but a] living dialectic which mediates between consciousness and world […] [and in so doing] reveals the world to consciousness (Deronne, 1976:57-59).

Gordon (1993:159) agrees that 'objects' in the external world account for the perceptions with which the mind engages. This is because sentient perceptions are in fact 'psychological' objects, and as Plato explains (Cirlot, 2002: xvi) "[w]hat is perceptible to the senses is the reflection of what is intelligible to the mind". For Goethe[30] "[w]hat is within is also without", while Merleau-Ponty (2004: 6) endorses Berkeley's thesis that questions whether "we can conceive anything […] not perceived or perceptible."

[30] Johann Wolfgang von Goethe was a German statesman, novelist, poet, artist among other designations and his oeuvre includes treatises on botany, anatomy and colour.

This understanding led me to position 'imago's' as 'psychological symbols', that while as diverse as people, places, melodies, toothaches or states of bliss, are capable of relaying bodily perceptions in a web of associations with other objects (Damasio, 1999: 9). It also led to an understanding of how 'psychological' imago's provide imaginal ingredients for primordial experiences, or the wordless knowledge that an object, in the external world, is changing the organism's own state of being. Damasio (1999:25) refers to this sense of self in the act of knowing an object as, "an infusion of *new* knowledge" continuously created in the brain as long as objects, present or recalled, interact with the organism and cause it to change. As Schrödinger explains (1967: 105) "consciousness is associated with the learning of the living substance; it's *knowing how (Können)* is unconscious."

Ramachandran (2004:38) promotes the idea that mirror neurons in the brain[31] might contribute to the development of consciousness, and if we envisage mirror neurons as involved in the construction of consciousness, as a state of mind with a self-process added to it (Damasio, 2010:157), then one can argue that self-reflexive consciousness infers conscious self-development or an "infusion of new knowledge" into consciousness. The Existential philosopher, Jean Paul Sartre (Wider, 1997: 42) convincingly argues that consciousness is self-conscious, because how else could 'it' become aware of itself through reflection, while Dan Zahavi (1999: 240) cautions against any conception of self-consciousness that makes inter-subjectivity impossible.

[31] In the mid-1990s neuroscientists discovered, quite by accident, a set of neurons in the premotor cortex of the Macaque monkey and in the premotor cortex and Broca's area in the human brain. These neurons are activated either by the subject's own motor behaviour or by the subject observing someone else's behaviour (Gallagher, 2002: 242). In attempting to explain the reciprocity within self/other dynamics, Ramachandran argues that in all probability mirror neurons are also involved in generating an embodied sense of self (Ramanchandran, 2004: 106).

However, if self-consciousness of consciousness, inherent as it is in the 'for-itself', [32] it arguably sanctions its own actions from twin or dual vantage points and one of these vantage points (Damasio, 2010:8), is the observer appreciating a dynamic object. The object is dynamic because it is constituted so by the workings of the individual's own mind, behaves in a certain way and has an historical context. The other vantage point is the self as knower, and following to Damasio, the differing vantage points correspond to two stages of evolutionary development, but the self-as-knower has its origins in the self-as-object, an idea very relevant to this creative art practice.

The Chilean biologists Maturana and Varela (1992, 18) confirm that cognitive experience (consciousness in a narrower sense of the term), involves the knower in a personal way and while consciousness has its root in his/her biological structure, it is a phenomenon that "lights up to itself only where or only inasmuch as it develops, procreates new forms" (Schrodinger, 1967: 107).

Contemplating insights such as these, it became important to make sense of how a specific object becomes a symbolising image for an art practitioner, and how recognising a symbolising image might suggest that sufficient neural pathways exist that allow the subject to experience the image in whatever cognitive modality it arises. A symbolising image can be known, but the development of neural pathways (Damasio, 2010:16), hints at a co-ordinating centre, as do nouns such as *psyche*, self, soul, anima, atman, among other historical designations.

[32] In Sartre's analysis, action is the ability to project oneself towards what one is not, or not yet. Only the 'for-itself' (*pour-soi*) by which Sartre references a mode of consciousness constituted by its own activity and purposive nature, can apprehend what is, against what is not (Wilder, 1997: 64).

Needless to say, contemporary consciousness research positions all experiences of ‘self’ as mirage-like illusions or “figments of the imagination” as psychiatrist David Hawkins (2012: 273) refers and this may well prove correct, because reality as contemporarily understood, is subjectively constructed. However, the psychologist and consciousness theorist Susan Blakemore (2017:310) offers that calling an experience an illusion does not mean the experience did not happen. This, she explains, is because the self is only a representation or model of something that does not exist, however, the model exists.

The British analytic philosopher Galen Strawson, vexed by ideas that suggest that experiences of consciousness are illusory (cited in Annake Harris, 2019: 71), asks how the existence of conscious experience can be denied when it is the only thing we know for certain exists. As Harris continues (2019: 71) “[e]ven if we agreed to call consciousness an illusion, which seems absurd, we would still wonder how deep this illusion goes […] [a]nd are other complex processes, or other collections of matter, experiencing this ‘illusion’”?

Amidst such controversy, consciousness remains difficult to define or study, even while many consciousness researchers including Dennett, Churchland, Sperber, Penrose, to name only a few, consider it the outcome of complex processes in the organism’s brain. While such scientists suggest we will discover the causes of consciousness by studying neural correlates, others contend that the ‘hard problem’, which is trying to explain why or how the mind of an individual becomes conscious of itself will persist, because, as yet, no scientific understanding offers direct insight into subjective experience (Harris, 2019 : 72).

This is because science has no yardstick for measuring subjective experience and therefore no means of affirming or countering the claim that

feeling experiences, with primordial-like overtones, are the illusionary consequence of a relentlessly constructed ‘self’ narrative. Damasio contends (2018:145) that we can refer to ‘self’ as an illusion as long as we acknowledge the active biological processes behind the illusion, and use these processes to explain the phenomenon and never dismiss the occurrence as an illusion without significance.

This suggests that, regardless of how illusive consciousness appears, symbolising imagery and the subjective meanings that can be unfolded from such imagery, belong firmly in the domain of consciousness research, because as Ramachandran puts it (2004:96), “you cannot have free-floating sensations with no one to experience them, nor do you have a ‘self’ devoid of sensory capacities.” Ramachandran here supports the idea that experiences of primordial-like feelings impart awareness of a ‘self-in-process’, because as he puts it, perhaps a ‘self’ is only ever experienced as unity (homeostasis and/or harmony), because experiencing two ‘selves’ is a logical impossibility and would lead us to question who it is that is experiencing two selves. Even in the case of a multiple personality disorder (Ramachandran, 2004:104 105) two different personalities are never experienced simultaneously.

Yet, as Damasio explains (2018:149) “[w]hen subjectivity disappears – when the images in mind are no longer automatically claimed by their rightful owner/subject – consciousness ceases to operate normally,” even while a simple trick of the mind, which Damasio calls the subjectivity or ‘ownership’ trick, can turn the image-making efforts of our minds into meaningful, orientating material, while in the absence of well-grounded subjectivity, the entire enterprise of the mind is rendered virtually useless.

As already mentioned, if we are to understand conscious self-development, we must make sense of how subjectivity relies on two essential ingredients,

which are; a perspective from which to comprehend the images in one's mind and a means of addressing how such images are accompanied by feelings. This, according to biologist Hans Jonas (cited in Thompson, 2007:129) is because *psyche* is not just self-organisational, functional or behavioural, it is also phenomenological. By this, Jonas implies that only lived, first-hand experience can adequately represent phenomenology as a discipline. Varela maintains that "experience is not reducible to anything else" (Hamerhoff, Kaszniak & Scott, 1998:31-42) and while not opposed to science, phenomenology, following Steven Gallacher(2007: 686), is opposed to scientism, or the claim that science is the only way of explaining everything there is.

While these insights suggest that phenomenology is the science of lived experiences, it still remains necessary to link experiential phenomena to contemporary scientific understanding, because the basic concepts needed to understand human experience are applicable to all life processes. As Jonas puts it (Thompson 2007: 129), the great contradictions that man discovers in himself, dark/light, autonomy/dependence, self/world, creativity/mortality, conscious/unconscious, among a myriad others, have inchoate traces in the most primitive forms of life and the precarious balance that exists between being and non-being. Each of these traces was and is already endowed with an internal horizon of transcendence, a process that he considers has relevance for the deep continuity between life and mind and/or psyche.

One of the real enigmas of the mind, according to consciousness researcher Michael Lockwood (1998:84), is that it is within nature's repertoire to generate consciousness as a subjective feeling experience, and while David Chalmers (Weisberg, 2014:1) agrees that the hard problem of consciousness research is trying to explain why or how the mind of an individual becomes conscious of itself, he also researches why feelings accompany such experiences. Following Damasio (2018:160),

“feelings do not accompany experience; rather they manifest as the outcome of processes necessary for the attainment of homeostasis”, or ‘homeodynamics’ (Damasio, 1999: 141) as neuroscientist Steven Rose prefers.

How to approach to the literature review

Cassim (2015: 18) suggests that a literature review should ‘paint a picture’ about what is known of the research questions posed. While this was my intention behind the research of my praxis, the interdisciplinary insights accumulated are documented in short subsections that follow directly on from each other, informing the whole as the narrative compounds itself.

Also, because the literature circumnavigated ideas embedded in the problem statement, the literature review tends to provoke questions rather than answering them. While consistent with Johann Mouton’s suggestion (2001:179) that a literature review “provide an overview of scholarship in a certain discipline”, the sub-sectioned overviews in this document are drawn from many disciplines. The reader is asked to watch the stop-frame video *Dust from dust: Microorganisms and other tales. An Artist’s diary* provided in the front of the catalogue accompanying the document, or to follow the web link established for the video and catalogue given at the end of the list of illustrations, to appreciate how, when manipulated, the symbiotic aggregations of bacterial yeast cells, might provide a visual analogy for self-organization and conscious self-development as a biological process.

At this point it remains necessary to acknowledge that the contents of this document have taken years of reading and self-reflexive inquiry and that it is inevitable that subjective insights have found their way into a project of this nature. Yet, such insights, even when controversial, if presented in a manner relevant to research in the humanities, can retain the dynamic of research processes and avert linear, one-sided approaches to knowledge acquisition. Needless to say, when such research grapples with notions of

conscious self-development, disruptive elements of subjectivity can enter the fray and delimit objectivity. However, by positioning the entire study under the theoretical frame of complexity theory, I was better able to navigate some of the difficulties encountered in a project of this nature.

The focus of the literature review (core literature search)

The initial research focused on how feeling-intoned bodily experiences facilitate self-organisation and adaptive harmonisation of an individual's life world environment, asking why primordial-like feelings can accompany conscious self-development, and why primordial-like feelings have immersive, 'feelings of existence' qualities to them. However, as the project developed, and as I engaged with extant research, I embraced a more open-ended approach when documenting the literature.

Complexity theory was instrumental in framing the open-ended, inter-disciplinary approach, as I strayed into disciplines such as contemporary biology and cell biology, including the Oparin-Haldane and Gaia hypotheses. Research into Quantum physics/mechanics was considered necessary to support ideas drawn from beyond the visible realm of biology and Newtonian Physics. Bohr's theory of spectra and atomic constitution enlivens the section on ancient alchemy, represented by notables such as Paracelsus, Hermes Trismegistus, Gerhard Dorn, Michael Maier, Heinrich Khunrath, Plato, Jacob Boehme, Isaac Newton, Ernst Rutherford, Marie-Louise von Franz, among many other famous alchemists, even though they are not explored further in the document.

The literature review also covers research into bio artistic practices, which as an arena of contemporary artistic research was central to the concepts on conscious self-development that I grappled with in this project. While highlighting the practice of certain bio artists, amidst other artists

mentioned, I specifically discuss an artwork by Eduardo Kac, Jun Takita and Jo Davies.

The discussion on bioart is followed by a short exploration of Heidegger's proposition, that being-in-the-world is simultaneously being-with-others. A proposition that focuses how at all times we are immersed within life and/or being itself, in a world only constituted by and with others. The writings of Nancy support this discussion and the insights gained from this research supported how I configured the performance Dust from dust: Microorganisms and other tales. An artist's diary, together with the vitrine and other paraphernalia in the exhibition venue.

As such, any reading of the performance of *Dust from dust: Microorganisms and other tales. An artist's diary*, relies on insight into Heidegger's interpretation of being, an interpretation that suggests that as finite beings we are alone in the world, 'a being towards death' as he refers, while simultaneously immersed in the world with others, both visible and invisible. This complex existential paradox not only underpinned how I configured the elements of the performance, but how, through darkening the one end of the gallery, the vitrine as self-reflexive mirror, evoked primordial mysteriousness and the idea of unknown mysteries at work beyond our reach.

Is it is possible for any of us to feel at home in this 'brave new world' where the nature of 'dark energy' is altogether obscure? This is Harold's question to us - or is the world, queerer than anyone has yet imagined, indeed stranger than anyone can imagine, as J.B.S. Haldane, who pioneered the origins of life, suggests (cited in Harold, 2014: 229).

The Literature Review

In the beginning – biology…

In Search of Cell History Harold admits that following his long rendezvous with spatial organisation in biochemical processes, he looks on cell

evolution and its extraordinary capacity to self-replicate, from the perspective of a physiologist. He also contends that one of the most profound statements on biological organisation is *cell theory*, which suggests that all living beings contain seemingly lifeless chemicals that function consistent with the laws of physics. His ideas are consistent with Shusteman's interdisciplinary inquiry into *somaesthetics* (2006: 2), which extends beyond the humanities to the biological, cognitive, and health sciences, and in his attempt to position the body as a locus of sensory aesthetic appreciation (aesthesis) and creative self-fashioning.

Cell theory asserts that the infinite variety of living things on earth come into being from a single architectural plan, where every organism is made up of cells, whether single-celled, or in societies of many cells. This is because cells are the atoms of life, and Harold maintains (2014: 2), 'life is what cells do'. Yet despite an enormous amount of research into how living things work, no theory or approach, no set of formulas or blackboard scheme, can satisfactorily explain the origin of the universe, the origin of life or the origin of consciousness.

Moreover, while the singularity of life is enshrined in some of biology's axioms, such as every cell emerges from a pre-existing cell and there is never, ever, spontaneous generation (despite the concomitant assertion that life did, a long time ago, emerge from an inanimate world), compels us to address the contradiction between life as part of the fabric or materiality of physics and chemistry, and life set apart. As Kauffman puts it (cited in Harold, 2014: 222) "life wandered into realms of chemistry and physics that are never explored by inanimate matter". As such, the emergence of life, and by extension also consciousness, remains a deeply disquieting subject

and as Harold re-iterates, there is as ‘black hole’ at the heart of science.[33] This gap in the conventional framework is real and serious and it is indeed time to cast our ‘story of life and consciousness net’ wider, to explore the depth of this mystery, as “there will be no leap of understanding, until we have real models to bring the incomprehensible within our ken” (Harold, 2014: 222).

According to Harold (2014: 223), in magnitude, duration, and sheer awesomeness, few tales match the story of life in the making. This includes creatures, that while intelligent enough to comprehend their own nature and mortality, are not entirely capable of managing their habitat, and he questions whether we need to postulate additional principles that lend direction to life’s history and the qualities (the contemporary one being complexity), that evolution maximises. If complexity is the criterion, then it provides a framework within which it is reasonable to claim that a yeast cell is more complex than a bacterial cell, and a mouse, comprised of several hundred types of cells, more complex than a yeast cell.

Needless to say, as a criterion (Harold, 2014: 224), complexity fails to do justice to our instinctive sense about what has evolved over time, or to explaining how deeply we are linked to the universe as a whole. Even so, Harold argues that evolutionary progression hinges on two positions, the one being ‘autonomy’ (or emancipation from the environment) and the other ‘agency’ (the capacity to act on our own behalf). These two positions provide clues, that contrary to all appearances following Harold, there is direction to life as a journey, indeed an odyssey towards self-awareness and/or the development of self-consciousness.

[33] On the authority of Harris (2019:70) the concept of emergence, as traditionally used in science, simply does not explain consciousness - as the observer sees matter behaving as it always does.

Jim Al Khalili & Johnjoe McFadden (2014:276) confirm that to date, science is unable to explain how the living universe constructs itself from seemingly lifeless chemicals. Puja Mondal (2017:2) maintains that the 'Modern' or Oparin-Haldane Theory suggests that physico-chemical processes on early earth organised to form the first living system we call cells, but that conditions suitable for the origin of life, existed only on 'primitive' earth, and Al Khalili & McFadden re-iterate that the three greatest mysteries confronting science today remain the origin of the universe, the origin of life, and the origin of consciousness. While no one still maintains that the first protocells assembled themselves from a menu of molecular precursors, caringly proffered by an abiotic chemical soup, Harold (2014: 221) notes that the search continues to find some sort of self-sustaining network of chemical reactions capable of aggregating matter and energy to itself, constructed a boundary and achieving the capacity to reproduce 'itself', while evolving towards ever greater efficiency, complexity, and autonomy.

The Oparin-Haldane hypothesis

Going back about 70 years, two independent scientists, a Russian, Alexander Oparin and an Englishman, John Burton Sanderson Haldane, while engaged in researching some of the mysterious and seemingly unfathomable chemical processes in nature, formulated a controversial theory, now referred to as the Oparin-Haldane hypothesis. Not surprisingly, it went untested for several decades.

The Oparin-Haldane hypothesis (Al-Khalili & McFadden, 2014:277) proposes that the atmosphere of early earth was rich in hydrogen, methane, and water vapour which, when exposed to electrical discharges, such as lightning, solar radiation or volcanic heat combined to form simple organic compounds. Oparin and Haldane argue that such compounds probably gathered in the warm primordial oceans of early earth and formed an organic soup that boiled away for millions of years until a chance

interaction yielded a new molecule capable of replicating itself. Science now suggests that this miniscule primordial replicator may provide a key capable of unlocking our understanding of the origins of life.

The Oparin and Haldane hypothesis proposes that the emergence of a primordial replicator spawned the origin of life and that all subsequent successes following its emergence have been subject to Darwin's theory of natural selection. In the evolutionary processes that followed, replicators proficient at capturing molecules capable of enzymatically catalysing their replication, would have gained an advantage, and some would probably have enclosed themselves within vesicles (tiny fluid or air-filled sacs) for protection from the exterior environment in much the same way that a cell membrane encloses the elements necessary to its sustenance and survival (Al-Khalili & McFadden, 2014:277).

Once this happened, biochemical transformation was possible and a paradigm established for maintaining an internal state separate from the external environment. Therefore, the paradigm that produced the first cell possibly established a template for life processes as contemporarily understood, because as Harold (2014: viii) acknowledges, the single cell represents a microcosm of life processes, and within it, the mysteries of our biological origins can be found to exist.

Lying fallow for several decades, the Oparin-Haldane hypothesis was eventually tested in the 1950s by a PhD student, Stanley Miller, under the guidance of Professor Harold Urey, a distinguished, but controversial Nobel Laureate. Miller tested the theory by replicating the conditions in which Oparin and Haldane hypothesised that life originated on earth. To simulate the primordial atmosphere, Miller used a bottle of water filled with gases such as methane, hydrogen, ammonia, and water vapour. He then simulated lightning by subjecting the concoction to electrical sparks. After

only a week of igniting the primordial atmosphere, the mixture contained a significant quantity of amino acids which, as organic compounds, are composites of oxygen, carbon, nitrogen, and hydrogen, among other trace elements, and the building blocks of proteins required in all biological processes. While this experiment remains a biological landmark, because it signalled the first step towards creating life in a laboratory (Al-Khalili & McFadden, 2014:277-279), the exactitude of life as a processual journey, remains deeply mysterious to the biological sciences.

*"*because we didn't begin as simple molecules"

Kauffman (cited in Capra and Luisi, 2014:284), who as a biologist and complex systems researcher, draws associations between God and the creativity of the universe, argues that life did not begin with simple molecules. According to him, when simple molecules capable of replicating themselves emerged, they were already very complex entities that continue to grow ever more complex over time.[34]

Kauffman further contends (cited in Harold, 2014:222) that life at its inception was already coincident with a degree of purposeful self-organisation, while Harold (2014:220, 221) insists that self-organisation and not diversification are coincident with the origins of life. Smolin considers 'universes' (where cells can be regarded as 'mini-universes') as dynamic, energetic entities. As such, they exist far from thermodynamic equilibrium and are in no danger of running down, because they generate order and structure at all levels of self-organisation, and that in these elusive but very real process, we must seek the origins of life.

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[34] Kauffman's ideas support evolutionary theory as a process by which living beings ontogenetically and phylogenetically modify as they diverge from a common ancestor. Creationism or "Intelligent Design" favours the guiding hand of a metaphysical deity, recognisable through patterns of organisation and design in the world. However, as Grayling (2010: 134) comments that evolutionary theory explains organisational patterns and structure just as well without a supplementary premise.

In his latest work, *The Strange Order of Things,* Damasio argues that "homeostatic imperatives" (2018:55) support cellular processes of cooperation, because without such 'whole-body' systems, the complex structure and functions of multicellular organisms is not sustainable. Damasio (2010:59) also argues that the survival intentions of the eukaryotic cell and the survival intentions implicit in human consciousness are no different, and he contends that symbiosis, in the construction of complex life, was an idea championed by the biologist Lynn Margulis, a proponent of the Gaia hypothesis (discussed later), at a time when such ideas were not even being considered.

Margulis's theory, now referred to as 'symbiogenesis' (Capra and Luisi, 2014:203), argues for the creation of new life forms through permanent symbiotic arrangements, as the principal avenue of evolution in higher organisms. According to Richard Dawkins (cited in Morton, 2010: 34) "we are all symbiotic colonies…" with symbiosis occurring within as well as amongst organisms. Understanding life this way, argues for the surfaces of living beings as both envelopes and filters, where skins, and/or membranes can be understood as merely thickened regions for complex chemical transfers. As already mentioned, at the 'microlevel' (Morton, 2010: 36), it is impossible to tell whether the melange of replicating entities are rebels or parasites, since distinctions between the inside and the outside cannot be made.

Trees and trees of knowledge

Maturana and Varela (1992:27-29) propose that every living being, from cells with a nucleus (eukaryotic cells have both a cell membrane and nucleus) to the human 'self', self-organise, noting that they do so not only to survive, but to maintain internal synergy, homeostasis and/or their own homeodynamic. Following Harold (2014:225), the conspicuous advances in life's history, the blossoming of autonomy, agency, and complexity, all point

towards the eukaryotic cell and its descendants, while Abraham (cited in Orsucci 2016: 41) contends that self-organisation is conceptually simple. Conceptually simple – yes – but capable of producing complex results by creating changes, including 'bifurcations', that once well-defined, are capable of influencing their own control parameters.

Maturana and Varela (1992: 29) position consciousness as "effective action", or action that enables a living being to continue in an environment and bring forth its life-world. Steven Jones (Ascott, 1999: 10) maintains that "information is the world in process" and perhaps consciousness our "experience of being that process", while Damasio argues that consciousness manifested (and continuously manifests) so that we can know life. He argues, as already mentioned, that consciousness begins as a feeling – a feeling of what is happening when we see, hear, smell, or touch. In other words, 'feelings' accompany the making of every psychological image, whether visual, auditory, tactile or visceral – within our living organism (1999:26-31).

Because feelings are 'imaginal accompaniments' to bodily processes, and because the apparent 'self' emerges as 'the feeling of a feeling' (Damasio, 2010: 76), even while being aware of the differing cognitive dimensions of perception, I elected to 'visualise' the primordial-ness of the feelings to which I refer. So, while my praxis incorporates ideas on conscious self-development, it is also concerned with understanding my studio practice as praxis. I came to this understanding through what I would describe as a form of 'psychological visualisation'. I used psychological visualisation as a means for unfolding the primordial-ness of certain feeling associations, held captive by the imagery with which I was working. Once satisfactorily unfolded, even while such processes are never considered complete, I became able to draw parallels between my *feelings of existence* and the inchoate *feelings of existence* evoked by the cellular processes in the glass

vitrine. While photographing the process culminated in the creation of a video, I then projected my artist's diary 'outwards' in a gallery performance.

It is the opinion of the theorist Helen Fielding (1996:179) that 'primordial depth' (or the experience of primordial-like feelings) depends on the "situatedness of being-within-the-world". In other words, it depends on self-organised adaptation and she confirms that feeling-intoned experiences are aspects of our own being. The biologist, Gerald Edelman (1989:186) refers to such feeling intoned experiences as "conscious of consciousness" and Susan Blakemore, who writes about "gradually waking up" (2017:308), refers to them as "seeing myself". Such pronouncements infer that primordial-like feelings are bodily experiences of consciousness emerging from one or more brain cortices within the individual organism concerned.

However, Blakemore (2017:315) acknowledges that there is no fixed self, no finite 'me' - only the stories we tell ourselves about what it feels like to be our self, because such stories arise from the model of *psyche* we have constructed for ourselves. As the philosopher and neuroscientist Sam Harris (2015:92) explains, "however one looks for it, the self is nowhere to be found […] [but] its absence can be found – and when it is, the feeling of being a self also disappears."

These insights infer that experiences of selfhood or 'self-knowing' manifest together with primordial-like feelings, because they register a certain quality or valence on the pleasure/pain spectrum. Consciousness theorists Hamerhoff et al. (1998:21) agree, arguing that all the problems of consciousness are identical with problems of *qualia*,[35] because feelings, fundamentally understood, are qualitative states. Hamerhoff maintains that

[35] Qualia refers to individual experiences of sentience. Following Ramachandran (2004:96), "you can't have free-floating sensations or qualia [sic] with no one to experience them and neither can you have a 'self' completely devoid of sensory experiences, memories and emotions."

if you take away qualia there is nothing left, because consciousness, by definition, is a subjective, inner, qualitative state of sentient perceptual awareness. According to philosopher Anthony Grayling (2010:346) “primordial-like qualia manifest as the vague awareness of inhabiting a first-person perspective wherein the self and the objects of the world come together in a new relational model of the world.”

These insights suggest a connection between primordial-like feelings and immersion as a living experience. However, Josh Weisberg (2014:1) suggests that this is not very helpful, because until we have a yardstick to measure the criteria of either our own or someone else’s thoughts and/or feelings, we have only an updated version of the old mind/body conundrum that Descartes’ philosophy concretised. Henry Stapp (1998:597) agrees by explaining that classical Newtonian physics, as a closed conceptual system within a narrow mathematical framework, provides no information on how a living being feels.

Up until now, a specific language by means of which we might account for how a living being feels has remained elusive, while the ability of a living system to model itself has entered centre stage in scientific research into cognition and/or consciousness (Blakemore, 2017:310). However, with science remaining resolute that any notion of a ‘self’ is only a mirage, Lis Nielsen’s argument (cited in Hamerhoff et al., 1998:719) that consciousness has a cognitive and emotional aspect that incorporates personally significant information, which poses a challenge to an otherwise stable self-system, was insightful in its implication that cognitive processes, in whatever sensory modality they arise, are subjective perceptions endeavouring to become conscious. As Damasio writes:

> The organism in question is that within which consciousness occurs; the object in question is any object that gets to be known in the

> consciousness process; and the relationship between the organism and object are the contents of the knowledge we call consciousness (1999:20).

John Dewey (cited in Johnson, 2006: 48-50), with his 'principle of continuity' introduces another theory that implies that an organism's capacity to perceive, feel, manipulate objects and simulate bodily movement, arise from the workings within an individual's own mind. Dewey's theory incorporates the idea that somewhere in the *psyche* of every individual there is a blind spot, a lacuna that science refers to as a black hole, and he demands we treat mind and/or *psyche* as a continuously emerging process of interior/exterior interactions rather than as an object or entity, because experience equates to purposive bodily activities in a continuous flow of organism-environmental interaction.

Biology, black holes and consciousness

The biologist Nick Lane (2015:1), confirms that there is a black hole at the heart of biology, and that we simply do not know why life is the way it is. While he affirms that the first cell emerged on one occasion about four billion years ago, he acknowledges that is was already a very complex entity when it emerged that has passed its complexity to its entire offspring. As such, when the cell emerged, it already constituted a microcosm or mini-universe, delineated by a cell wall or membrane,[36] and, in the case of eukaryotic cells, directed by a nucleus.

Nevertheless, for the most part, we engage in a world where Newtonian physics progressively maps the macroscopic world, while the electron microscope, amongst other technologies, introduces us to microscopic worlds and beyond. Powerful electron microscopes allow us to witness

[36] According to Maturana and Varela, a membrane is a morphological structure that creates a cleavage in space (1992:44).

intra, extra, and inter-cellular processes. However, to date, no available technology has identified, or formulated a mathematical equation capable of delineating a 'self', or nucleus within a living organism, even while the electron microscope introduces us to opportunities capable of deepening our understanding of processes within nature. Understandings that may even contribute to intercommunication between different cultures, were we to conclusively realise how intimately and inseparably interconnected we are on the grand parade of life processes.

Looking closer, we might also realise how analogous the cell is to life processes and how the cell wall or membrane represents an interface between intra-, inter- and extra-cellular dynamics. In healthy systems, cellular requirements move freely between the cell's interior and exterior life-world environments, supplying the needs of the organism that the cells serve. The cell wall delineates its interior life-world from its exterior life-world, in much the same way that human skin delineates one human being from another, or an animal skin, one animal from another. What Maturana and Varela argue is that there is no discontinuity between what is social and what is human and/or animal. They refer to the continuous process whereby an individual cell, together with its cell wall/membrane, delineates itself from other cells in its environment, as a coincident structural dynamic. In other words, Maturana and Varela (1992:46) invite us to consider cognition and consciousness, however invisible, as just such a process when they write about cells:

> …a unique situation [exists] as regards relations of chemical transformations: on the one hand, we see a network of dynamic transformations that produces its own components and that is essential for a boundary, on the other hand, we see a boundary that is essential for the operation of the network of transformations which produced it as an unity […] These are not sequential processes, but

> two different aspects of a unitary phenomenon. It is not that first there is a boundary, then a dynamic, then a boundary and so forth. We are describing the type of phenomenon in which the possibility of distinguishing one thing from a whole (something you can see under a microscope for instance) depends on the integrity of the processes that make it possible. Interrupt (at some point) the cellular metabolic network and you will find that after a while you don't have any more unity to talk about!

The biologist's Lynn Margulis and Dorian Sagan (Thompson, 2007:161) claim that every cell is a conscious being and that cellular processes are co-extensive with life processes. Michael Lockwood (1998:86) also supports the idea that lower organisms possess consciousness, and links consciousness to the establishment of meaning in life. His suggestion, that the sentience a thing or object embodies, must be subjected to conceptualisation, interpretation, and identification, for its meaning and/or personal implications to be realised, was significant.

These insights accord with Damasio's contention (2018:153-154) that consciousness is a state of mind, wherein objects are imbued with subjectivity, and that manifestations happen - as a subjective symbolising object (an imago in Jungian literature), becomes integrated into a broader psychological canvas. This is because consciousness is not only related to life, but to the universe of chemistry and physics, that can be understood as the substrate of organic life within which we all find our existence. While no single brain locus for consciousness has been found to exist, the inter-relatedness and/or self-organisation of the system produces the key ingredients, which, following Damasio, are: 'perspectival stance'; 'bodily feelings'; and 'experiences of integration' and/or immersion as the living experience of integration.

Capra and Luisi (2014:257), in agreement with the Santiago theory[37] developed by Maturana and Varela, concur that consciousness permeates all levels of life. However, they differentiate consciousness from cognition, which, following them is a broader phenomenon than consciousness, and reduce consciousness to lived experience only, or phenomena of which an individual is aware. They contend that consciousness unfolds itself at certain levels of cognitive complexity and acknowledge that it requires a brain and highly developed nervous system to support its processes. Their views are supported by Damasio (2018: 154), who explains that body regions and systems participate in processes as an ensemble, entering/departing as needed for self-organisation.

In her work, *Echo Objects: The Cognitive Work of Images* (2007:21,132), the theorist Barbara Stafford encourages artists and visual researchers to explore how self-organisation proceeds in nature, and following her encouragement, I spent a great deal of time observing how the bacterial yeast cell aggregations in the vitrine continuously self-organized themselves. While entirely fascinated, I was not initially able to comprehend how the bacterial yeast cells held significant information captive and/or how they constituted 'psychological objects' from which significant subjective knowledge, capable of influencing conscious self-development, might be gleaned. Only over time, did striking paradoxes such as life/death, or indeed birth/death, become evident as inferences amidst the myriad associations held captive by the imagery.

However, because the philosopher, Kathleen Wider (1997:31) proposes that "[c]onsciousness of self and consciousness of the world are born together in the activity of synthesis", a statement that supports the idea that

[37] The central insight of the Santiago theory developed by Maturana and Varela in the 1970s identifies cognition with the processes of knowing as well as the processes of life (Capra & Luisi, 2014:254).

conscious self-development requires active engagement with the imagery of contemplation, I persisted in my praxis. In other words, I subjected the cellular symbiosis to conceptualisation, identification and interpretation (Lockwood, 1998:86), and was eventually, over time, able to embody the research findings and in so doing appreciate the significance of certain subjective imaginal associations contained by the symbiont.

The Gaia hypothesis

In his journal article *Stories to Live by,* Martin Ogle (2014: 17) appeals for a new story about where we find ourselves, namely one that attempts to explain the times we live in, and which might guide us to saner pathways and reparation of the devastating effects human society has inflicted on our habitat and environment. Contending that societies are judged by knowing values to hold on to and which to let go of, Ogle promotes the idea of keeping cultural mythologies alive, yet flexible, and responsive to the changing positions that new insights, such as biological body/mind interconnectivity, initiate. While this knowledge comes into being from many research disciplines, Ogle considers stories such as the *'Earth is alive', 'Human Beings Are a Part of Nature, Not Separate'* and '*Our Minds and Creativity Are Seamless Extensions of this Living Planet'* capable of contributing to redefining present mythologies because they eliminate body/mind dissonance from the narrative and creatively portray nature as processual.

In this regard, Watts and Peet (Potts, 2003: 30-31) explain how creative visual imagery can intersect with environmental imagery, and inspire new narratives capable of providing, what they refer to as, "prime sights of contestations between normative visions", because such narratives provide a means of understanding the degree to which human society is entangled with nature as a biosphere.

One of the most compelling narratives of ‘Earth as a biosphere’ or living, interconnected system, is named after the Greek Goddess Gaia, and referred to as the Gaia Hypothesis. I researched this hypothesis to enrich my understanding of how science and spirituality are being brought together, consistent with Robinson and Combs contention (1995: 17) that new research insights suggest that everything is interconnected and that everything evolves together. In other words, the Gaia hypothesis provided insight into consciousness and its inseparable relevance to conscious self-development and the narratives of Earth as a biosphere.

The Gaia hypothesis, or the theory of Earth as a living organism, was developed by James Lovelock, with significant contributions from, amongst others, the microbiologist Lynn Margulis. While the Gaia hypothesis does not represent a single theory (Turney, 2005: 6), it promotes the idea that the global environment of Earth, including its atmosphere, temperature, water, air, soil, and much of its geology, is produced/preserved and/or regulated by the combined activities of the planet’s living organisms (Haigh, 2014: 49).

However, according to Massimo Pigluicci (2013:118), with very few exceptions, the Gaia hypothesis was rejected by the scientific community, because its main tenets go pretty much against everything we know about biology and evolution. Pigluicci (2013: 121) also finds Lovelock’s mention of religion, “scientifically uncomfortable”.

The idea of Gaia first came into being when Lovelock was consulted by NASA (United States National Aeronautics and Space Administration), regarding the tests necessary to detect whether or not life existed on Mars. Lovelock responded that the signature for life (i.e. oxygen, carbon dioxide), and other reactive gases that we understand to be products of photosynthesis and other biological processes, would be clearly visible

from a distance. In other words, if the spectroscopy[38] indicated that the atmosphere on Mars shifted from chemical equilibrium, it would be a sign that organisms were at work maintaining the unstable mix. Lovelock argued (Schneider, 1990:6) that inorganic and organic processes of a planet are not independent, and together with Margulis, postulated that both the Earth's biota, together with the environment, self-regulate to maintain the climate and chemical composition of the planet in a state favourable to life. Stated differently, Lovelock and Margulis postulated that the Earth as a whole, is an interconnected physiological system.

Trying to establish which aspects of Gaia, as a theory, have gained wider traction than others, is not a simple matter, according to Jon Turney (2005:7). However, he supports Lovelock's assertion, that since the 1970s our conception of Earth has changed profoundly, and that recognition of entire ensembles of living organisms interacting with the environment as a 'biosphere' continues to inspire research.

Gaia, or the hypothesis that 'life' regulates the terrestrial conditions on Earth, is finally emerging from the shadows of fringe science and being embraced by many avenues of research into *'planetary homeostasis'.* Even Richard Dawkins, the evolutionary biologist and author of '*The Selfish Gene'* and '*The God Delusion'* emphasises that "we are all symbiotic colonies of genes" (cited in Morton, 2010: 34). While once a fierce critic of the Gaia hypothesis, because he considered the organism responsible for selection and not the biosphere, Dawkins now embraces some of Gaia's central tenets (Turney, 2005:7). Following Turney, Dawkins emphasises Darwin's doubts about how organisms evolve collective influence on the environment, when natural selection tends just as well to favour free-riders

[38] Broadly speaking, spectroscopy is the study of the interaction between matter and electromagnetic radiation.

who feel the benefit without putting in the work required for the common good.

Lovelock (2003: 769) even discovered ‘cheaters’ when he designed ‘Daisyworld’ in 1981, which as a model of dark and light coloured plants in competition for growth on a planet of progressively increasing sunlight, served to demonstrate Gaia’s consistence with natural selection. Following Lovelock, ‘cheaters’ were easy to demonstrate, as some daisies continue to grow while offering nothing towards the self-regulation of the whole.

The Daisyworld model regulated its own temperature at close to optimal for plant growth and, unusual for a model of coupled differentials, was stable, insensitive to initial conditions, and resistant to perturbation. According to Lovelock, as a model ‘Daisyworld’ is Darwinian, but the evolution of its organisms and the evolution of the temperature proceed as a single coupled process. Some critics claimed that the daisies adapted to differences in temperature and did not regulate it, but Lovelock insists that the function that connects growth and temperature is not negotiable, and that chemistry, not biology, sets its constants. As Harold remarks (2014: 210) cell evolution, as we understand it today, is not the world Darwin knew, but its Darwin’s world all the same.

The many stories ‘Gaia’ story

In essence Gaia is a many ‘stories’ hypothesis. The philosopher and physicist James Kirchner, describes five different hypotheses (Schneider, 1990: 8), which are each supported by Lovelock, Margulis, or one or other of their close colleagues. The following are separate avenues of research into Gaia, evidencing its complexity:

- Influential Gaia - biota have a substantial influence on certain aspects of the abiotic world, such as the temperature and composition of the atmosphere.
- Co-evolutionary Gaia - biota influence its abiotic environment and that the environment in turn influences the evolution of biota by Darwinian processes.
- Homeostatic Gaia – biota influence the abiotic world through negative feedback loops and do so to contribute to overall stability.
- Teleological Gaia – the atmosphere is kept in homeostasis, not just by the biosphere, but by and for the biosphere.
- Optimizing Gaia - biota manipulate the physical environment to create biologically optimal conditions for itself.

Quantum physics

It has been almost a century since physicists began perceiving the world differently and accepting the counterintuitive idea that light has both wave-like and particle-like qualities. Quantum physics is now an established research discipline in which quantum physicists and/or mechanics attempt to explain inconsistencies in the physical properties of matter. Suffice it to say, following Niels Bohr's discoveries in *Theory of Spectra and Atomic constitution*, the findings of quantum physics challenge dualistic models of life (Al-Khalili & McFadden, 2014:44).

Bohr's theory of spectra and atomic constitution

In 1922, Bohr received a Nobel Prize for his contribution to physics, when he described the atom as a series of subatomic particles (electrons) in orbital rotation around a central nucleus. Bohr's theory was an attempt at visually describing the inner, invisible realm of atoms and subatomic particles and of aligning this understanding with the macroscopic objects of classical Newtonian physics. While all attempts at such alignment involve

intense scientific scrutiny, to date no mathematical formula capable of defining the atomic particle as a radically different ontological[39] type exists.

Another pioneer of the quantum field, doing research at much the same time as Bohr presented his *Theory of Spectra and Atomic constitution,* was the physicist Ernest Rutherford. Rutherford won a Nobel Prize for chemistry when he established that atoms, while relatively stable structures, concentrate the greatest part of their mass and positive charge in a 'nucleus'.

Rutherford – Heisenberg – Schrondinger – and a cat[40]

In 1927, following and complementing the work of Bohr and Rutherford, the German physicist Werner Heisenberg introduced a mathematical formula that described the world of atoms and subatomic particles. Heisenberg's famous Uncertainty Principle scientifically confirmed that it is not possible to measure an electron's position and speed simultaneously because the electron (as subatomic particle) spreads out in an ambiguous and mysterious way. As Morton puts it (2010: 31) there is no way of measuring anything anymore, as there is no 'outside' of the universe, from which to take an objective measurement. Bohr (cited in Churton, 2005: 377) declared: "[a]nyone who is not shocked by quantum theory has not understood it", while scientist and astrophysicist John Gribben asserts that "nothing is real when we look at it, and it ceases to be real as soon as we stop looking" (cited in Churton, 2005: 377). Moreover, all of this happens below the threshold of ordinary vision, which necessitates formulating mental images of invisible processes hypothesised to exist.

[39] I use the term "ontological" to infer a qualitative sense of "other" and/or "more".
[40] Schrödinger's 'cat in a box' theory states that if you place a cat together with something that could kill the cat, a radioactive atom for instance, in a box and sealed it, you could not know if the cat was dead or alive until you opened the box. So until the box is opened, the cat is (in a sense) both 'dead' and 'alive'.

The scientist Erwin Schrödinger, whose life work was about questioning ‘what is life’ and exploring the physical aspects of living cells and their relationship to mind and matter, conducted research at the same time as Heisenberg and conceived of a means through which we might visualise the invisible quantum realm. He suggested that we form a mental image of an electron as a fuzzy particle in an unknowable position inside an atom simultaneously spread out like a wave throughout the atom. He visualised the electron as a physical wave when not being looked at, which collapses into a discrete particle when observed.

Quantum physicists refer to this entangled correspondence, where subatomic particles behave as both waves and/or particles, as wave/particle duality, and most biochemical reactions in the biosphere are the outcome of wave/particle duality. This includes the conversion of air, water and light into plants and microbes, and indirectly in all human beings as well. However, following Al-Khalili and McFadden (2014:16-17), wave/particle duality is of little significance to our everyday lives, unless it is measured. Does consciousness measure? Because, as already mentioned, Jung (1959: 230) states that “division is true within the sphere of consciousness”, which implies measurement and/or differentiation.

Questioning why measurement converts quantum behaviour to classic Newtonian behaviour, Al-Khalili and McFadden (2014:17) suggest that it is because measurement, and by extension life and consciousness, exist on a borderline or ‘quantum edge’ between our quantum and classical understanding of matter. This suggests that some understanding of wave/particle duality is relevant to an understanding of conscious self-organisation and/or self-development.

Perhaps it is from this perspective that Macleod and Holdridge (2006:1) suggest that “[a]rt is always in and of the world”, and why Jim Mooney

(mentioned earlier) considers how, at certain moments in time, the surface of an artist's body elides with the surface of an artwork to become one with it, so that the knowledge embedded in the artwork imprints within the artist's working consciousness (Macleod & Holdridge, 2006:142), because as Al-Khalili and McFadden argue (2014:49), "[o]nly through the act of [seeing] can we 'force' the electron to become a localized [sic] particle" and only through engagement with "the object being known" (Damasio, 1999: 197) is it possible to recognise how it holds subjectively meaningful content, accessed through an engaged practice-as-research undertaking.

All ideas on consciousness as a self-developmental process remain speculative, however, as elusive as consciousness appears to be, Al-Khalili and McFadden (2014:247) maintain that it does contribute towards self-development and is a quantum mechanical problem. And, as Johnson is cited earlier notes, it is not a question of how two different metaphysical substances interact, but how characteristics attributed to mind, such as the ability to conceptualise, reason and understand, to know and to will, emerge from invisible physical processes.

While not further explored in this project, Al-Khalili & McFadden (2014:265) offer that a possible brain site for quantum phenomena is within ion channels in neuronal cell membranes. Needless to say, the deep inter-relationship between the neurological system[41] and the skin of an individual represents a rich avenue for research that might contribute to how we understand subjective, feeling-intoned experiences, and how exterior experiential occurrences influence conscious self-development.

[41] In human embryology three primary layers i.e., the ectoderm, endoderm, and mesoderm serve as primitive tissue layers from which all the organs of the body develop. The ectoderm exclusively fashions the structure of the nervous system and the skin's epidermis. This suggests that an intimate interconnection exists between these two systems from the very beginning of life processes (Marieb, 1998:1090).

Interestingly, both classical and quantum physics give almost the same predictions about most physical properties of matter, even while classical physics alone is unable to explain consciousness as a self-developmental process. However, Henry Stapp maintains the Bohr/Heisenberg/von Neumann/Wigner framework (not explored further), provides a description of nature that supports the idea that thoughts and feelings are symbolic images, because as Stapp remarks (1998:605), "if consciousness is a self-organising network that assists adaptation and improves an organism's chances of survival and/or self-development, it seems necessary to consider how atomic behaviour, unaccounted for by classical physics, depends on collapse events (or measurements in consciousness) to exert knowledge advantage to the organism concerned".

According to Stephen Jones (Ascott, 1999:9), the theoretical physicist Eugene Wigner considers that because thought processes and consciousness are primary concepts, all knowledge about consciousness of other beings must be mediated by the physical world. Applying this understanding, Jones concedes that just as light quanta never influence each other directly and only by influencing other material bodies do they exert influence on other light quanta, so too "consciousnesses", an idea akin to Liebniz's notion of the monad (Schrodinger, 1967:139), never seem to co-operate directly with each other. As the feminist philosopher and history of consciousness researcher Karen Barad puts it (2012: 209) "try as you may, you cannot bring two electrons into direct contact with each other". While these insights suggest that consciousness self-organises its own embodiment, if consciousness only mediates via the physical/material realm, one could argue that all mediation of consciousness is contingent on life-world imagery, and because Schrödinger (1967: 140) emphasises that consciousness is never experienced in the plural, only in the singular, I entered into a process of engagement with the yeast cells in my studio, in a

manner that paralleled the ancient alchemists engaging with their *prima materia*.

However, it is likely that in some sense the alchemists engaged unconsciously with their *prima materia*[42] when developing their work, seemingly captivated by the gurgling, bubbling processes of their crucibles in much the same way the gurgling, bubbling, self-organizing symbiosis unfolding in the vitrine in my studio, captivated me.

Ancient alchemy

Ancient alchemy is a vast and at times obscure area of research that preceded modern chemistry as we understand it today. However, in my praxis, I researched alchemy as an early parallel to modern psychology. I did so not only to show why I consider some of the insights gleaned from it relevant to conscious self-development, but to support Jung's contention that far too many people cannot see the extent to which images lie dormant in the unconscious aspect of their minds and how, if we are to facilitate inner vision, it is necessary to clear the way for what Jung considers "the faculty of seeing". How this can be achieved without psychology or without making contact with the individual's own *psyche* is, to quote Jung, "frankly beyond my comprehension" (Jung, 1980: 13).

When examining the thought-world of alchemy, Jung recognised how the conscious mind, when confronted with mystery, is at a loss to ratiocinate the enigmatic phenomenon, and he realised that it is then that the unconscious mind projects images and ideas from an interior well of archetypes onto external phenomenon. As such, alchemy defined a

[42] The term *prima materia* refers to whatever physical 'base' substance the alchemists were attempting to transmute in their crucibles.

physical practice in which an adept person could potentially become unified with the significance of the associations embodied by an object.

Applying these insights, I eventually recognised, albeit 'through a glass darkly', how much the yeast cells growing in the vitrine in my studio represented a parallel for conscious 'feelings of existence'. Once I recognised this I began, through contemplative participation, unfolding perceptual feeling associations the imagery held captive. In so doing, I began to differentiate feelings of pleasure from remembered experiences of pain, and I argue, that the processes engaged with, were similar to how the alchemist's engaged with the *prima materia* of their crucibles.

In the philosopher Tobias Churton's opinion (2005: 381), we always need more than thoughts to sustain us. He even suggests that something like an active principle of complementarity might do the trick, and reminds us of how much the alchemists saw the embodiment of sacred, spiritual, or psychic processes in the chemistry with which they worked. Yet even while they perceived themselves to be connected with the chemicals with which they were working, Merleau-Ponty (2004:5) would interject that it was the 'intentionality' of consciousness that drove the alchemists to align their 'perceived world' with their *prima materia,* which drew its relevance from their life world understanding and/or knowledge. Because, as Merleau-Ponty puts it (cited in Leder, 1990: 210 & 217) "I am not merely consciousness – neither am I merely flesh. I am flesh and blood," a kind of closed circuit that 'coils' over both the visible and invisible.

While a closely guarded secret of every alchemist, the *prima materia* or artifex[43] constituted the chaos within which they thought the anima mundi or world-soul was held captive. Comprised of elements such as quicksilver, ore, iron, gold, lead, salt, sulphur, vinegar, water, air, fire, earth and blood,

[43] Artifex is another alchemical term for prima materia.

among other elementary substances, the alchemist's referred to the elements with which they worked and from which they developed their work, by names such as water of life, lapis, poison, spirit, cloud, sky, dew, shadow, sea, mother, moon, dragon, Venus, chaos, and microcosm, among many other designations.

Unlike the church (Jung, 1980: 34) whose rituals and dogma can be argued to have alienated consciousness from its biological roots in the unconscious mind, both alchemy and astrology engaged in preserving an individual's connection to nature by preventing its decay (in the unconscious mind). In other words, alchemy and astronomy, as protoscientific disciplines, attempt to keep nature, in all its vicissitudes, alive in the mind. Needless to say, alchemy always stood on the threshold of heresy, and while certain decrees leave us in little doubt about the early church's attitude towards alchemy, it protected itself by the obscurity of its symbolism, which could always be explained away as harmless allegory.

Another important insight is that the real nature of matter, as we understand it today, was unknown to the alchemists, who perceived only its sentient nuances, while their conditioned thought processes led them to believe the perceptions were coming from outside or beyond themselves. Nevertheless when exploring their prima materia, they seemingly projected their own unconscious minds into the obscurity of the matter they were attempting to illuminate (Jung, 1980: 244). As Jung reminds us (1980: 432), materialistically there is no *prima materia* at the root of everything that exists, simply because nothing that does exist could be discerned at all without a discerning *psyche*.

Only because of psychic existence do we experience 'being', and consciousness, even while we are only capable of grasping a fraction of its nature. This is because consciousness is the product of a preconscious life (Deleuze and Guattari's rhizome), from which consciousness develops.

Yet, as Jung remarks (1980: 433), consciousness can succumb to the delusion that it develops out of itself, even while science is well aware that consciousness rests on unconscious premises.

So, while the early alchemists appear to have engaged unconsciously with their own unknown and unconscious background, at quite an early stage of my studio practice, I considered the possibility of self-styling an alchemical approach to my praxis and of consciously manipulating the bacterial yeast cell aggregations in the vitrine to unfold contemporary ideas on consciousness as a self-organisational, self- developmental process. Once decided, each tiny step taken inspired a little more confidence about embodying some of the ideas being researched, because, as Trevarthen and Delafield-Butt (2017: 3) contend, the development of self-consciousness "begins with imagined projects, appropriate for moving intentionally from the present moment, step by step in measured time." This idea is supported in *The Organization of Behaviour* by the psychologist Donald Hebb (1949: xix) who writes that

> Any frequently repeated, particular stimulation will lead to the slow development of a 'cell-assembly', a diffuse structure comprising cells […] capable of acting briefly as a closed system, delivering facilitation to other such systems and usually having a specific motor facilitation. A series of such events constitutes a 'phase sequence' – the thought process. Each assembly may be aroused by a preceding assembly, by a sensory event, or – normally – by both. The central facilitation from one of these activities on the next is the prototype of 'attention'.

John Hunt, the Tissue Engineer adds

> In life, the molecules required to create […] structures effectively self-assemble, resorb and reassemble […] [in] a dynamic environment driven to work within the homeostatic limits of the body (cited in Hauser 2008:61).

He goes on to add:

> [f]rom blinded mittened origins we can now delicately dissect and interact with this world within – exciting does not begin to touch where we stand in terms of understanding life and working with it rather than making the best of it (cited in Hauser, 2008:61).

The Sassenach[44] artist Yvonne Hawker refers to her gnostic connection[45] as

> a light that lights up in myself, in those quietest of moments, and binds me, and frees me with humankind. And it's something that happens on your own, and yet links you with so many others (Churton, 2005: 402).

Hawker's poetic reference to 'her gnosis' is arguably relevant to the processes in the studios of contemporary bio artist's and it inspired my own bio artistic practice in a self-styled alchemical studio. It also added support to how I configured the performance of *Dust from dust: Microorganisms and other tales. An artist's diary.*

Bio art and bio artistic practices

Bio art is contemporary and interdisciplinary, and a collaborative art form that engages with biological materials as well as scientific tools and protocols considered integral to both artistic processes, and the artworks or outcomes of such processes. As a contemporary art form, bio art provides an interface at the intersections of art, science, biotechnology, bio-philosophy, bio-politics, among many other diverse and inter-disciplinary arenas of research, and some theorists, such as Eduardo Kac, consider it capable of assisting science in understanding itself.

Eduardo Kac is a bio artist who confirms that bio art is not merely about creating new objects, but about creating new subjects. According to Kac (2007: 19-20) the dialogical, relational, cross-pollination, social intercourse,

[44] Sassenach is derived from Scottish Gaelic, meaning an English-speaking person of Scottish decent. An inference that personally resonated with me.
[45] The word gnostic or gnosis is used to reference an individual and/or knowledge of spiritual mysteries.

cellular interaction and ‘interspecies communication’ are just as important as the material and/or formal qualities of the artworks produced, and while other art disciplines might focus on creating specific objects and positioning them in specific environments, even evoking notions of immateriality, bioart specifically focuses on organism development and species evolution. It also promotes ‘synesthetic experiences’ that rearticulate individual consciousness within social, cultural and environmental realms (Simone Osthoff, n.d.: 1-2).

Amongst numerous objectives, I considered bio art an art form capable of realising an evocation of being-in-the-world-with-others processes and of highlighting how such processes can be redefined so as to remain meaningful. As Nancy puts it (cited in Ellis, 2011: 1 - 2), “sharing the world is the law of the world”, where existing is co-existing, and he posits “primordial being-with” as a means of demonstrating how the self I am, thrives only because it is always already in a situation of plurality, of ubuntu[46] and/or being-in-the-world-with-others, writing

> coessence puts essence itself in the hyphenation – ‘being-singular-plural’ – […] is a mark of union and also a mark of division, a mark of sharing that effaces itself, leaving each term to its isolation and its being-with-the-others (Nancy, 2000:37).

Yetisen et.al (2015:726-727), suggest that scientific discoveries have been meaningfully stimulated through juxtapositioning art and biology as Alexander Flemming discovered that fungi killed bacteria in his paper ‘germ paintings’ in the 1920s. Brandon Ballengée’s (Yetisen et. al 2015: 726) more recent explanations for missing limbs in amphibians, while useful to environmental and developmental biology, have also led to further scientific field studies. The photographer Edward Steichen’s (1879-1973) week long exhibition of flowering delphiniums, presented at the Museum of Modern

[46] Ubuntu is a South African word of Nguni origins that could be argued as a parallel for the idea of being-in-the-world-with-others. Loosely translated it means ‘I am because you are’.

Art in New York in 1936, is still declared one of the hallmarks of bio art. However, Steichen is not alone in dealing with the hybridisation of plants. Claude Monet, Cedric Morris, William Caparne and Eduardo Kac (discussed below) are among many artists renowned for their accomplishments in both horticulture and art.

SymbioticA

In 1996, researchers Ionat Zurr and Oron Catts developed an interest in the use of contemporary biological methods of inquiry and established SymbioticA, an artistic research laboratory in Perth, Western Australia. As a tissue culture and art project, SymbioticA is one of the world's pre-eminent bio art collectives, dedicated to exploring the possibilities of tissue engineering as a medium of artistic expression and following Van den Hengel (2012: 5) "stimulating a new sense of the ethical and affective interrelations between human and nonhuman forms of life".

Zurr and Catts are motivated by the opportunity to re-imagine the ontological status of the entities they create outside of bio-capitalist logics and their approach to artmaking questions deep rooted perceptions of life and identity, the concept of self, and the position of the human in regard to other living beings and the environment (Zurr & Catts, n.d: 2). According to them (Catts & Zurr, n.d: 2), the cells and tissues they use are kept alive and grown in technical environments that acts as surrogate body's, and while this idea had relevance for my praxis, it is also why Andrew Lapworth (2015: 86) regards bio art as representive of an approach to artmaking that is capable of challenging an audience's perception to their own body in relation to other (human and nonhuman) bodies.

Primarily, Zurr and Catts specialise in projects that involve methods of regenerative medicine and tissue engineering, in which selected cell types are grown on biodegradable scaffolding, and they use the term 'semi-living'

to describe some of their work with bio artistic materials. Works such as *Semi-living Worry Dolls,* involves mouse fibroblast tissue grown onto substrates that resemble Gautamalan 'worry dolls', traditional dolls used by Guatemalan children to absorb their worries at bedtime (Yetisen et. al. 2015: 724).

Collaboration between science and art is not a novel idea. Leonardo da Vinci practiced both science and art. Leonardo argued (cited in Neumann, 1971:41) that "[a]ll our knowledge […] has its origin in our perceptions." Neumann continues by suggesting that in the text, the word "perception" could also translate as "actual experience", which would further explain Da Vinci's enduring attempts to integrate his art with scientific understanding.

However, more recently, instruments such as Magnetic Resonance Imaging (MRI) among other biotechnological devices have provided alternative tools for representing the body, identity, even self-portraiture. While biotechnical engagement falls under the umbrella of bio art, Zurr and Catts use the term 'bio artist' to specifically refer to artists who use life and living beings as their medium and subject matter.

Many bio artists also use vegetable or plant matter (as opposed to animal material) and apply methods developed in horticulture, botany, and biology. Deborah Dixon (2009: 415) states that bio art is a 'diffuse movement' that, while characterised by a diverse range of techniques, takes in account the 'wet-are' of biotechnology, because it uses 'life' itself as the medium of expression.

Hauser discusses the enhanced phenomenological aspect that carbon-based bio-artistic artworks call to mind. He suggests that such works produce a "presence" capable of "touching" the audience, even engendering feelings of empathy (cited in Dixon, 2009: 415 -416). By

using of the term ‘presence’ Hauser considers that pre-cognitive and/or sensory affects are capable of psychologically ‘touching’ the audience in an invisible and non-tactile manner, “an electromagnetic interaction”, as Barad[47] refers (2012:209). She continues by adding (2012:209), “[a] common explanation for the physics of touching is that one thing it does not involve is […] well, touching.” In other words, the ‘touching’ to which Barad refers does not actually involve physical contact.

Hauser (cited in Dixon, 2009: 415) also draws distinctions between bio-artworks that heighten phenomenological encounters for their own purposes (such as the intention to consciously self-develop through self-organising a new understanding of life as processual) and bio-artworks which “deploy affect”. Following Hauser, “being touched” (cited in Dixon, 2009: 416) relies on face-to-face encounters with the living body of the spectator and the living body of the artwork – as in such bio-artworks, explicit manifestos for change (whether social or other) are articulated. He also suggests that such artworks are commended over and against merely sensuous artworks, because their authenticity exists outside of authorial and curatorial explanations.

Hauser places the word “authenticity” (cited in Dixon, 2009: 416) in inverted commas, to differentiate between the practices of different bio artist’s, and draws attention to how the stated objectives of some bio artist’s is neither autotelic,[48] nor embodied in the life-world practice of the artist. Using this argument, Hauser argues how certain bio-artworks are potentially capable of articulating a philosophy for social change and that such works are

[47] Barad is a professor of feminist studies, philosophy and the history of consciousness. She holds a doctorate degree in theoretical particle physics, or more specifically quantum field theory. She is the author of *Meeting the Universe Halfway: Quantum physics and the Entanglement of Matter and Meaning* and is currently working on a book entitled *Infinity, Nothingness, and Justice-to-come.*

[48] Autotelic refers to an activity or creative work that has an end or purpose in and of itself.

distinguished above and beyond mere haptic sensuousness. As philosopher, Jacques Ranciére puts it (cited in Dixon, 2009: 412).

> Suspend the ordinary coordinates of sensory experience and reframe the network of relationships between spaces and times, subjects and objects, the common and the singular.

Barad (2012: 208) reframes this as “the touch of entangled beings (be)coming together-apart […] [of] be[ing] in touch, in ways that enable response-ability”. Applying insights such as these allowed me to continue developing the bacterial yeast cells in my praxis from within the broader research discipline of bio art while embracing what Louis van den Hengel (2012:4) refers to as ‘co-shaping motion’. Following Van den Hengel, bio art represents non-representational life-storying technology that is capable of presenting us with imaginative possibilities for the theory and practice of ‘posthuman life’ or *zoegraphy,* as his writings refer.

Zoe, according to the post human theorist Rosi Braidotti (2013: 136), references life or the generative force of nature, where *zoegraphy* is a secular discourse within critical theory that addresses the nature-culture continuum from within “a monistic ontology that considers all matter as intelligent and self-organising.” Following Braidotti, this post-human continuum, is neither human, nor divine, in any dogmatised sense of the word, but material, and committed to multi-directional, cross-species relationality.

However, while necessary to establishing human/non-human connections as a research discipline, bio art faces many ethical problems around defining what separates ‘human beings’ from ‘other’ beings. As Zurr and Catts argue, “in our well established self/other cultural dichotomies, the perceptions that humans are somehow a separate, privileged life form, a product of Classical and Judo Christian heritage, is shifting” (Zurr & Catts,

n.d:1-3) and bio art, as self-creative expression, is a means through which representations of this shift are articulated. This, following Van den Hengel (2012:4) is because bio art intervenes *between* human and non-human vital processes, processes specifically demonstrated by growing and manipulating biological matter, such as cells, genes etc. to create new life forms.

This, in the opinion of philosopher and biologist Nicole Karafyllis (Hauser, 2008:53, 58), is because "only growth generates evidence of life". In her writings she questions whether a subject that undergoes growth, experiences '*growth*' as the medium of its own life. A question I address in my studio praxis, because as Karafyllis argues, if conscious self-development is a subjective bodily experience, then the organism who experiences 'body' is 'individuating' (i.e. physically experiencing themselves within a self-developmental process). This is so because we perceive growth in much the same way that we perceive sound, touch, etc. Dennett confirms (1993: 47 & 101), that while we may 'feel' things by touching them, the conscious sensation produced is the outcome of elaborate processes in which information from a variety of sources is integrated, even while no cell or group of cells are apparent as keystones of these processes.

Damasio (1999:9) is in agreement with Karafyllis's insight that only growth provides evidence of life and he re-affirms that perceptions are symbolising images that make up the currency of our minds. Therefore, as Karfyllis argues, if perceptions are mental patterns already mapped into one of the sensory cortices in an individual's brain, and the organism perceives 'growth', it is probably because 'feelings of growth' are emerging from a memory percept already mapped by the body. What is significant though, is that the memory percept relays whether the experiences were pleasant or

painful, comfortable or uncomfortable at the time of the mapping (Damasio, 2010: 63-68).

Following Braidotti (2013: 137), “[t]he kind of self, styled in and through such a process is not yet one, nor is it an anonymous multiplicity”, because as Deleuze explains, “[i]nteriority constantly hollows us out, splits us in two, doubles us, even as our unity subsists. Lotman (cited in Law-Viljoen, 2008: 4), succinctly expresses how through a criss-crossing of boundaries, we are led, to what she calls, “a constant state of hybridity … oscillat[ing] between identity and alterity”.

Eduardo Kac

According to Kalenberg (2008: 90), Kac (pronounced Katz) is a talented and protean visual artist, essayist, and theoretician who works as a pioneer and protagonist in many fields and continuously explores the intersections between art, science, and technology. Following Hauser (2008: 156), Kac emerged in the early 1990s and became internationally recognised for his interactive net installations and bio art. His work addresses concerns that range from the mythopoetics of online experience, to the cultural impact of biotechnology, from the changing circumstances of memory in the digital age, to distributed collective agency, and from the problematic idea of *exotic* to the simple creation of life and evolution.

Hauser maintains (2008: 156), that by the beginning of the 21st century Kac had opened a doorway for contemporary art by writing *Transgenic Art* in 1998. In this classic tome, Kac describes *Transgenic* art as a mode of artistic creation that uses genetic engineering techniques to create new life forms. His first ground-breaking transgenic artwork *Genesis,* which involved cloning a synthetic gene into plasmids before transforming it into bacteria, was produced in 2000, and in 2001 he produced the *GFP Bunny* called Alba (2001).

Kac states that an important issue that he explores in his art is the chasm between opticality and cognisance, or the chasm that oscillates between the immediate perceptual field dominated by the surrounding environment, and what is not physically present, yet affecting us in many ways (Hauser, 208: 106). Included in this perceptual field is an astounding list of vectors that shape our contemporary experience, such as the global economy, digital culture, online relationships, multiplicity of identities in cyberspace, integration of organic and artificial life, microchip implants, biotelemetry, the reading and writing of genes, plasticity of skin and flesh, DNA computers, satellite, telephony, xenotransplantation, astrobiology, wearable technologies, neuroprosthesis, telepresence, piracy, patenting and commerce of foreign genetic material, new algorithms, and real viruses.

Kac proposes (Hauser, 2008: 107) that as the list grows, art becomes increasingly capable of contributing to larger cultural debates by using the tools of other disciplines to expose cracks in standard approaches. It also contributes by proposing new stories or different models that present alternative ways of being-in-the-world-with-others. Kac's telepresence art shows us that from a social, political and philosophical perspective, what is not immediately visible around us is as relevant as what we can see, and that as optical fibres thread the soil like so many worms, and digitally encoded waves cross the air like flocking birds, a new ecology, Harold's 'brave new world' is emerging. This is an ecology, which following Kac (cited in Hauser 2008: 108), mediates between carbon and silicon.

For one of his artworks, Kac grew a petunia and called it Edunia, and while not an ecology of carbon and silicone, Edunia mediates between plant life and human life. Edunia is a flower of nature, that when injected with Kac's own blood, exhibits dark red, blood-like 'veins'. Arguably a more complex process than just explained, and given a name that clearly plays on Kac's first name, Eduardo, Edunia sparked public interest as a plantimal, a

genetically engineered new life form. While a hybrid of Kac and a petunia, Edunia is/was nevertheless an independent 'being' capable of self-organising its own embodiment, even flourishing while carrying the blood of another being in its veins. In developing and exhibiting Edunia, Kac evoked the interconnectedness of life as biological and processual (Grau, 2011:72-73).

Jun Takita

Jun Takita was born in 1966 in Tokyo and received his Master's qualification from Paris Ĕcole National d'Art in 1992. He uses his art making processes to explore how living things utilise and convert the phenomenon of light and in a novel gesture at self-portraiture, Takita grew bioluminescent transgenic moss and covered a three-dimensional replica of his own brain. This replica evoked the simultaneity of opposites, such as emitting/perceiving, self/other, interior/exterior, while grounding the self-reflexive realisation that dyadic oppositions cohere in a single organism, because as Drew Leder notes, the "lived body is chiasmatic[49], both perceiver and perceived" (1990: 210).

Drawing his visual inspiration from the concept of traditional Japanese gardens, Takita's artwork, *Light only light* expresses, what he considers humanity's desire to possess light. It captures the viewer's attention because it emits light in much the same way as algae, fireflies, glow worms and certain deep-water fish (Hauser 2008:141-143). However, because Takita replicates the human brain's inner structure by covering it with bioluminescent moss to evoke photosynthesis, a biological life form that emerged prior to the development of the human brain and central nervous system, he provides us with a visual means of accessing and

[49] The term chiasmatic refers to a crossing or intersection of two pathways such as occurs in nerve tracts and/or ligaments. In genetics, the point of contact between paired chromatids during meiosis results in a cross-shaped configuration that represents the cytological manifestation of crossing over.

acknowledging his insight into the deep interconnectedness of biological processes.

Bonnie Bassler, who specialises in the study of chemical communication and cooperation between bacteria, considers that the primordial cooperation observed in bioluminescent bacteria set the scene for the emergence of cells and cell specialisation and led to the complex organisms we recognize today (Krajewska, 2017: 18). As Krajewska adds, "cooperation towards a common goal happens at all levels of biological life and supports the intentions behind all cultural practices."

In traditional classifications, beings that utilise photosynthesis, a process whereby light is transformed into energy, belong to the plant kingdom because they do not exhibit bioluminescence.[50] In other words, in terms of biological evolution, photosynthesis and bioluminescence should not exist together in a single body (Hauser, 2008: 143), but in recent times, it has become possible to create luminescent plants through genetic manipulation.

Light only light is a self-reflexive model of Takita's own internal cerebral organ, alive and perceptible and made possible through new biotechnologies (Hauser, 2008: 141). A singular experience that goes against conventions that suggest that a boundary separates the inside from the outside of the body. In *Light only light* the interior/exterior boundary is not a barrier at all, but a set of networks, just as the brain mass is comprised of neural networks and millions of interconnections through which ecological information is transformed into life world imagery.

[50] Bioluminesce refers to the production and emission of light by a living organism or being. It occurs widely in marine vertebrates and invertibrates, as well as certain fungi, microorganisms and including certain bioluminescent bacteria and terrestrial invertebrates such as fireflies. In some animals, the light is bacteriogenic i.e. produced by symbiotic organisms, in others it is autogenic i.e. produced by the animal itself.

Takita also engages with what he refers to as the 'brain's skin', the crumbled cerebral cortex, composed as it is of folds of grey matter that play a significant role in the development of consciousness, visual perception, and the development of our outer skin.[51] As he explains, "light, caught in an infinite space between the observer and the observed" (Hauser, 2008: 141). In *Light only light,* rather than creating its own volume, Takita uses the bioluminescent moss to cover the surface of the support to create a skin of light - a landscape-image where the spectator is confronted with a 'self' image and/or portrait. This image captures the relationship between humans and light, while addressing the question of physical and mental existence – as the one brings the other into being – because it is through light and perception that our life-world comes about.

Takita (Hauser, 2008: 143) maintains that *Light only light* presents the 'utopia of our era', as the viewer is capable of seeing the light he/she is capable of creating – a technique of man's own invention that allows him/her to create a luminous 'other' – expressive of an always incomplete journey towards light. In *Light only light,* as a bioluminescent brain garden, the phenomenon of light unfolds a unified perceptual experience in which emitting and perceiving are presented as simultaneous, self-reflexive gestures.

Joe Davis

In 1986, together with Dan Boyd (a Harvard geneticist and molecular biologist), the scientist/artist Joe Davis put secret messages into actual double-helix DNA-carrying modules in a genetics laboratory at MIT. He called his artwork and poetic image *Microvenus* as it consists of a graphic

[51] As already mentioned, in human embryology three primary layers, the ectoderm, mesoderm and endoderm serve as primitive tissue layers from which all the organs of the body are fashioned. As the ectoderm exclusively fashions the structure of the nervous system and skin's epidermis, Takita also intimates a deep interconnection between the two systems (Marieb, 1998:1090).

icon, much like an 'I' and a 'Y', superimposed. Creating *Microvenus* involved genetically engineering an organism, using short sequences of DNA base pairs, which were then incorporating into a living strain of *E. coli* bacteria[52] (Kac, 2007; 257). The purpose of the project is to code a sequence of values that while invisible to the human eye, attempt to communicate with extra-terrestrial intelligence (Davis, 1996: 70-74).

E coli was chosen because of its fragile living carriage, which is usually incapable of enduring exposure to air and sunlight, and the objective behind its design is to update the arts and humanities in terms of recent insights into the molecular basis of all living beings. In other words, the physical form of *Microvenus*, the raw materials used and the formulas and procedures applied to assemble it, are fundamental to all living things.

While undoubtedly a scientifically complex undertaking, *Microvenus* is considered an artwork that represents interdisciplinary collaboration because it straddles the boundaries between art and science. The 'Venus' icon, which as a graphic image belongs amongst the oldest messages Homo sapiens have left for themselves, inspired the *Microvenus* project. However, as an artwork created to communicate with extra-terrestrial intelligence, it certainly includes scientific aspects not usually included in artistic practices even while the human body remains more comprehensively represented in ancient stone and terracotta Venus-like objects than any scientific messages ever rocketed into space (Davis, 1996: 73).

However, as the message encoded into *Microvenus* specifically reference homo sapiens, it is anthropocentric in its inception, as whoever discovers it

[52] *E. coli* is a gram-negative, facultative anaerobic, rod-shaped, coliform bacterium of the genus *Escherichia,* commonly found in the lower intestine of warm-blooded organisms (endotherms). Most *E. coli* strains are harmless and are part of the normal microbiota of the gut. They have a symbiotic relationship with their hosts by producing vitamin K2, and preventing the colonisation of the intestine with pathogenic bacteria.

will first need to interpret its message, have the ability to read and write language, as well as have a scientific attitude towards nature and insight into imaginal/psychological messages. Davis (1996: 74) justifies this by offering that sending messages to extra-terrestrial intelligence is at once about humanity's search for itself and the idea of a 'self' within every individual being. As he puts it, *'we'* must first be able to reveal ourselves to ourselves before we can reveal ourselves to anyone else, and this dilemma, while central to any understanding of art and/or bio art, history, psychology, philosophy etc. both classical and beyond, is relevant to humanity's search for extra-terrestrial intelligence, because natural phenomenon are subject to the same dynamics as any self/other relationship. However, any complete description of natural phenomenon (Davis, 1996:74) must include multiple points of view, the chemical composition of the body, as well as its processes of adaptation in its natural and social environment. As such, *Microvenus* is an artwork that looks in two directions simultaneously, that is, outward to an unexplored universe filled with 'others', as well as inward to the self and to nature - as also human nature.

It is Davis's hope (Kac, 2007:249) that through only asking questions, the "invisible something" will respond and the whole universe will be brought to life, because many of nature's self-organising secrets are invisible and begin "rhizomatically", far below the threshold of ordinary vision and/or mundane perception. An "anonymous visceral dimension" (Leder), "the invisible which moves and lives beneath gross forms", as futurist Umberto Boccioni refers (Ascott, 2003:229).

For these reasons, bio artists, along with many other research disciplines, continuously explore every aspect of 'bio' through whatever means they find appropriate, in various endeavours to close gaps in our understanding between the everyday macroscopic and the mysterious underbelly of

micro-organic processes that exist for the most part invisibly and outside of conscious awareness. Many bio artistic events are ephemeral and unrepeatable, and such events, following Kac (Hauser, 2008: 107), are celebrated in bio art as a 'singularity'. Whether an event or performance, they enable aesthetic knowledge and/or knowledge of a phenomenal nature to be expressed visually, and in my performance find accord in Nancy's (2000: 79) "the place of a being-self-in-other … [where] the mystery of communion announces itself in the nearby" and Heidegger's contention that being-in-the-world is simultaneously being-with-others.

Being-in-the-world is being-with-others

Heidegger asserts, as noted above, that 'being-in-the-world' is simultaneously 'being-with-others'. I support this contention in this project with interdisciplinary research insights from the writings of Nancy, Ratcliffe, Barad and Sanford Drob, amongst others, as I lead the reader to the chapter on the methodology of my studio practice.

I deliberate on Heidegger's contention that 'being-in-the-world' is simultaneously 'being-with-others' because an understanding of its meaning is necessary to any appreciation of how I configured the elements of *Dust from dust: Microorganisms and other tales* to read as '*An Artist's diary'* when performed in the Unisa Art Gallery in 2018. It also facilitates an appreciation of why the vitrine, used to grow yeast cells into symbiotic aggregations to mediate ideas on conscious self-development as a self-organising feeling continuum, was presented together with the stop-frame video.

Ratcliffe (2002: 287-288) asserts that Heidegger's primary concern in *Being and Time* is, much like the writings of Nancy, the 'meaning of being', and because emotions and feelings are central to his philosophy, he explains that, "the being of beings is not itself a being". In fact, Heidegger

criticises traditional philosophy's demotion of feelings to "accompanying phenomena" and his writings grapple with how necessary feelings are to being-in-the-world-with-others processes.

According to Heidegger (cited in Ratcliffe, 2002: 288), our "practical" engagement with the world provides better "clues" for understanding 'being' than the traditional prominence given to theory. This insight, when coupled with Damasio's proposition (mentioned in chapters one and two), that the ground of 'being' is a feeling continuum continuously structuring and re-structuring an individual's psychological foundation, supported my decision to use a practice-as-research approach to visually fashion an idea of primordial-like feelings in self-organisational communion.

Martin Heidegger and Jean-Luc Nancy

In *Being and Time* (2010:33) the Existential Philosopher Martin Heidegger asks

> What is it that is to be called 'phenomenon' in a distinctive sense? What is it that by its very essence becomes the necessary theme when we indicate something explicitly? […] [m]anifestly […] it is something that essentially belongs to what initially and for the most part shows itself […] [but also] what remains concealed in an exceptional sense, or what falls back and is covered up again, or shows itself only in a 'disguised' way, is not this or that being but rather, […] the being of beings.

The task of a phenomenologist is to describe intentional experience in all its details, in terms of 'the noematic' aspect of experience, as Edmund Husserl refers to it (Gallagher, 2007: 687), or how things appear in conscious experience. This is the stance Heidegger takes when defining 'being' in *Being and Time* (1927) in his attempt to reconcile the 'ontic' (real, as opposed to phenomenal existence) and the historical (West, 1996: 100).

To avoid locating consciousness as an abstract bearer and organiser of experience, Heidegger positions 'Being' (*Dasein*) as irreducibly situated and inter-subjective. Death, following Heidegger (Stambaugh, 2010: 263), is the 'ownmost' possibility of *Dasein*. While West (1996: 101 & 103) considers that Heidegger's idea of Sorge (care) also references 'being-towards-death', as any experience of being-in-the-world is only apprehended from within an individual's life-world or milieu. As such, Heidegger's view bears little trace of the detached consciousness of the Western philosophical tradition (David West, 1996: 101).

Following Heidegger, West (1996:100-102) defines *Dasein* as 'being-there' while simultaneously also 'being-here'. In the German language, '*Dasein'* expresses 'existence', rather than 'essence', as it was already apparent to scholastic tradition during the Middle Ages, that existence, or the substance of a thing, is different from its essence. As such, being-in-the-world, following West, is 'being' primordially and constantly whole and *Dasein's* 'being-there'/being-here' is inseparable from being-in-the-world, which as the primordial condition of being-with-others, involves an essential relationship of care (Sorge).

In order to avoid the solipsistic predicament in which the 'I' becomes separated from 'others', Heidegger positions the 'world' as the one always shared with others. In other words, *Dasein* is a 'world' before all worlds and 'itself' before itself as being-in-the-world (Stambaugh, 2010: 182). So, just as the fundamental relationship of *Dasein* to the world should be one of care, the primordial relationship to 'others-in-the-world' ought to be one of mindfulness.

Nancy (Welch & Panelli, 2007:1-3), is of the opinion that in *Being and Time* Heidegger affirms that being-with (*Mitsein*) is essential to the composition of *Dasein* or being-there. This is because being-there encompasses within

itself the primordiality of being, that is, being-with (*Mitsein*). In fact, Heidegger introduces the term *Mitdasein* to literally mean being-there-with and posits *Mitsein* and *Mitdasein* as co-essential with ***Dasein's*** essence, as they bring into play both the subject's innate sense of Being as well as the sense of Being itself (Nancy, 2008:2).

While *being-with* and *being-there* constitute co-essential conditions for ***Dasein's*** essence, Brogan (2010:302) offers that for Nancy, space-time[53] consists of the primordial 'between' that is at once physical. Physical because it is the space of emergence or the event in which *beings* attached to one another, 'interlacing' their strands of *being*. As such, *Dasein* is characterised by the bringing into play, performing or exposing its own Being. Even so, following Nancy, it does not have to become, it only has to come to itself, and can only do so by taking responsibility for an essential non-essence, whose sense is a being-exposed or brought into play (Nancy, 2008:3).

In *Being Singular Plural* (2000: 6) Nancy addresses singularity, or the singular experience of finite existence, and he does so by subjecting singularity to the notion of 'plurality' or common-being, writing (2000: 3) "[t]he *nihil* of creation is the *truth* of meaning [and] [b]eing cannot *be* anything but being-with-another, circulating in the '*with'* and as the '*with'* of this singularly plural coexistence." This is consistent with contemporary demand to establish ourselves as 'we', because, as Nancy argues, each being is constituted by 'being-with' as the very possibility of its being itself (Brogan, 2010: 297).

[53] In science, space-time is a mathematical model that unites the three dimensions of space and the one dimension of time into a single four dimensional continuum. Through unifying space and time cosmologists were better able to understand how the universe works on the macro scale, such as in galaxies, and on the microscale, such as atoms and subatomic particles.

In other words, there is no other meaning than the meaning of circulation, a circulation that goes in every direction, simultaneously. Heidegger refers to this as 'distantiality' (Heidegger, 2010: 122), while Brogan (2010: 300-302) supports the idea that being-together is also a form of distance, arguing that closeness is not about doubting the space of another as separate from oneself, because being able to 'touch' another only requires being exposed to that which is different or 'other' from oneself, where '*existence'* means to be in touch with all beings.

In asking questions such as, "how do particles sense one another" Barad (2012: 208) offers new ways of thinking about the physical, physics, and notions of 'touch', referring to a "virtual exploration of possibilities", while describing (2012: 212) "a particle touching itself and being touched by all possible others – a self-touching –an encounter with the infinite alterity[54] of the self".

Interestingly, in the *Enumeration of the Passions* (1968: 358) Descartes also suggests

> [w]hen the first encounter with some object surprises us, and we judge it to be new or very different from what we formerly knew, or from what we supposed that it ought to be, [it] causes us to wonder and be surprised… (1968: 358).

Consciousness is division

In Heidegger's opinion, both the meaning of being and an understanding 'being', arrive simultaneously. Wider (1997:31), already mentioned in Chapter Two, proposes that "[c]onsciousness of self and consciousness of the world are born together in the activity of synthesis", while Nancy agrees that being is not a final orientation, but a "sharing" that simultaneously implies division (Brogan, 2010: 298). These insights imply

[54] Alterity refers to a state of being other or different.

that consciousness is a process of endless psychological opening, realisation and/or becoming, in accord with Jung's contention (1959: 230) mentioned in chapters one and two, that "division is […] true within the sphere of consciousness".

Verbs such as opening, division, becoming, manifestation etc. describe the original parting of being (Brogan, 2010:299), a unique act or event of being - and its performance helps reify the primal act of creation – because the divine, following Nancy (cited in Brogan, 2010:299-300), is the original, primordial dispensation, a "dis-positioning", a spacing and a distancing - that opens up the world which happens, following Gallagher (2007: 687), precisely because "consciousness is always conscious of something".

As such, sharing an intimate space within which all beings are interconnected, does not suggest the disappearance of 'singularity', because creation remains manifest in the wonder of all that is, but in suggesting a site of plurality, creation references the constant repetition of the singular creative event - in its "singularity". As Brogan summarises (2010: 300) "Creation is the original taking place. It is place, being-placed, which of course also means being dis-placed".

Self-consciousness – an artist's diary

> The path of self-consciousness can easily lead through desire and recognition of the other, but it is traced beforehand as the circular process of the Self of this consciousness […] and does not tremble before its own differentiation (Nancy, 1993: 11).

Nancy writes (1993: 168) "[a]t the heart of … [language there is], a truth-telling throbbing of the heart of things". According to Drob, and perhaps relevant to this practice-as-research project, is that 'truth-telling' is reified as the coming into being of an "opened" or amplified understanding of just how much "we need new stories" that help humanity understand itself.

Perhaps a story that tells of how ‘existence’ means to be in touch with all things, because exteriority is simultaneously ‘in me’, in my body, as an unbound wealth of life and organic processes. A story that tells of how existence manifests in the infinite multitude of healthy bacteria and yeast cells without which I, or indeed ‘we’, could never flourish, because as Myra Hird (2010: 36) puts it, “species-defying organisms precede relating”. In her article *Meeting with the Microcosmos,* she encourages us to recognise that “I am bacteria, and that our symbiotic and symbiogenic ancestry means that it is *symbionts all-the-way-down*” (2010:37) and this is because the world and ideas of ‘self’ lack their full depth until some reference is made to the chiasmatic relationship between ‘me’ to other ‘perceivers’ Drew Leder (1990: 211).

In the chapter on *The Coincidence of Opposites*, Drob suggests (cited in Leslie Stein, 2019: 115), that, given the different schools of psychoanalytical approaches, such as Lacan’s argument that the development of the symbolic requires the developing child to break with the mother (Blackwell, 1999: 317) Freud’s pioneering of psychoanalysis, Jung, Adler etc. and the conflicting paradigms of differing psychological approaches (biological, cognitive, behavioural, psychodynamic, existential etc.) the only means of opening, is an embrace of the rejected aspects of the ‘other’ within ourselves. In other words, return to “a dialectical expansion of consciousness tolerant and inclusive of opposition and apparent contradiction (Drob, 2018:300)”. This implies we recognise life as a continuously flowing river, that regardless of how many times we step into its flow, the same water never washes over us. This is the case, even as we care for the river in a manner similar to how we care for ourselves, just as Heidegger’s ‘*Sorge’* or ‘care’ (2010: 57) mentioned earlier in the chapter, suggests.

Churton (2005: 380 -381) is of the opinion that Bohm interprets quantum physics as “undivided wholeness in flowing movement”. In other words, he acknowledges that everything is in flux while considering how the physics of his holo-movement has immediate practical consequences capable of providing a noetic ground plan for the struggles against fragmentation of the world’s resources (ecology), fragmentation of the mind (psychology and psychiatry), fragmentation of the body (medicine), and the painful fissures throughout human society (politics). While a difficult undertaking, much of the work of this practice-as-research project has been about personally integrating and synthesising new insights and knowledge in order to revise previously held ideas on consciousness created through cultural conditioning and religious education, and to then project the knowledge gained outwards in a performance. At the same time, I also attempted to marry the primacy of my praxis to the theoretical research and in this regard was supported by Orsucci’s contention (mentioned in Chapter One), that most of the real work is merely about facilitating the mind’s own natural self-organisation and/or re-organisation, which he maintains, can transpire through an engaged, self-reflexive research praxis.

Artists like Jo Davis, (Krajewska, 2017: 11) also attempt to unfold ideas about the *Umwelt*,[55] by paying tribute to lower life forms and shifting away from anthropocentric paradigms. In this way, they too have discovered nous[56] and meaning in ecology itself. As Brogan explains (2010:300), “[t]he matter we are is uniquely our own and yet teeming with life forms that co-habitate with us. Creation, as the imparting of being, is, in a sense, the ‘generation’ of being as singularly plural, and the witness humans can give to this unbridled circulation is to say ‘we’ to all things and to the totality of

[55] Jakob von Uexküll used the term umwelt to reference the environment as perceived by the organism.

[56] Nous is a word historically aligned with intuition, perception and awareness and/or consciousness.

all beings". Welch & Panelli (2007: 350) refer to this as "coincident drawing apart, and drawing together". Brogan continues by suggesting that Nancy may well surpass Heidegger in his contention that 'we are' as opposed to Heidegger's 'it is'.

CHAPTER THREE

‘We are the story’

Introducing *Dust from dust: microorganisms and other tales. An artist’s diary*

An idea central to creative practice-as-research is that ‘doing is knowing’, or indeed “imitating is knowing”, as Cirlot (2002: xviii) argues. As such, the artist’s studios become their locus or laboratory where the ‘doing’ transpires and wherein subliminal conscious/unconscious knowledge, can be raised into consciousness, through processes that are at once complex and mysteriously feeling-toned. However, where successful, they may well lead to self-development and consciousness of that development.

In this project, I juxtaposed bodily feelings processes alongside ideas of immersion, a well-documented, primordial, mysterious, feeling-intoned experience, recognised as the momentary dissolution of the boundary that separates the self as an individual being-in-the-world, from other-individual-beings-in-the-world.

This, following Ramachandran (2004:104), is because the self, by its very constitution[57] can only ever be experienced as a unity. While immersive experiences are well-documented in written form, in this project I elected to develop, manipulate and photograph symbiotic cellular aggregations and to choreograph, edit and perform a notion of immersion using the stop-frame video *Dust from dust* as a critical element of the feeling-intoned performance.

[57] The ‘self’ is not an empirical reality, but its exact nature is impossible for the ego to delineate. At best all we can do is look at this idea of selfhood from different angles and try to fit together the different pieces of the meaning it holds for us personally (Edinger, 1996: 34).

While Heidegger's contention that being-in-the-world is simultaneously being-with-others, which Nancy summarises as 'being singular plural', has already been discussed, the configuration of the performance was supported by these authors' ideas. I considered it a performance because I presented the video along with the vitrine I had used as a self-reflexive mirror in my studio practice, and in so doing placed emphasis on how much practice is not just about *doing* but about *re-doing* over and over again. In this way, I habituated understandings gained by invoking feelings of immersion, not only as a being-in-the-world-with-others process, but as a continuous subjective diary, open like the vitrine, and intentional in the world, contingent on the logic of Roger Sperry's contention (cited in Trevarthen and Delafield-Butt, 2017: 2) that "a creatures mind is apprehended through observing the "output" of their activity in movement." In this sense, the vitrine was the means of giving visual form to an understanding of consciousness as an enduring life/death/life processes, 'dust from dust', and conscious self-development, as a consequence of the understanding gained.

At no time was my praxis about producing an object or artefact (the stop-frame video documents the processes engaged with), rather it was about engaging in a heuristic psychological process, through which I was able to realise enlightened contemporary understandings and conscious self-development, as a consequence of the processes with which I engaged.

My studio praxis

Introducing 'useful things' required to create my visual diary

In the section that follows, I introduce the reader to 'useful things' (Heidegger, 2010: 69) that is, to the utensils or tools deemed necessary to initiate a self-styled alchemical studio praxis.

According toJung, the alchemist's personified nearly all their important ideas. In other words, they concretised things such as the four elements, the vessel (vitrine), the stone, the prima materia, the tincture etc. as well as the idea that man is a microcosm representative of earth and/or universe. A representation that retains a remnant of an original psychic identity still reflected in the twilight of consciousness. The alchemical text below succinctly expresses this

> Man is to be esteemed a little world, and in all respects he is to be compared to a world. The bones under his skin are likened to mountains, for by them is the body strengthened, even as the earth is by rocks, and the flesh is taken for earth, and the great blood vessels for great rivers, and the little ones for small streams that pour into the great rivers. The bladder is the sea, wherein the great as well as the small streams congregate, The hair is compared to sprouting herbs, the nails on the hands and feet, and whatever else may be discovered inside and outside a man, all according to its kind is compared to the world (Jung, 1967: 92).

Useful things

- A table or trestle of suitable height on which to place the vitrine to work comfortably.
- A glass vitrine.
- Yeast cell solution (kombucha)
- Sufficient water to retain the required horizon, so that the camera focused and photographed the pellicle of cellular aggregations as they formed at the surface of the kombucha liquid.
- Green tea.
- Sugar. The initial recipe indicates brown sugar, but white sugar works just as well and reduces the discolouration of the liquid which improves the quality of the photographs.

- LED light box, built to correspond with the size of the vitrine and coupled to an electrical supply to illuminate the processes in the vitrine during photography.
- Camera lens suitable for photographing microscopic objects.
- Memory cards.
- Extra re-chargeable camera battery to eliminate delays during shooting.
- Vegetable dyes to enhance colour transformations where necessary.
- A thin wooden and/or plastic dowel to stir, manipulate and/or disrupt the process when photographing.
- Polystyrene base to absorb the tension produced by the weight of the liquid in the glass vitrine when placed on a hard surface.

Kombucha – the fungus of charity

In recent years, scientific research has revealed how significant the human microbiome is to health and homeostasis and the Kombucha story supports these revelations.

Kombucha[58] is a 2000-year-old sweetened green tea health brew, thought to have originated in Manchuria or Russia. The initial culture was obtained from a work colleague, who acquired it from the Gaia Research Institute near Plettenberg Bay in South Africa. In my Master's project, I used the skin-like 'pellicle' that develops at the surface of the liquid, to create huge swathes of symbiotic membrane. The membranes were presented arising

[58] Scientifically, kombucha is a symbiosis of anaerobic ethanol fermentation (yeast), anaerobic organic acid fermentation (by bacteria), and aerobic ethanol oxidation to acetate (by bacteria). The fermentation takes place along an oxygen gradient. The culture is comprised of acetobacter bacteria and saccharomyces yeast types mixed with tea and sugar. The symbiotic community of the culture, is referred to as a scoby (symbiotic culture of bacteria and yeast).

from glass containers placed on light boxes on the floor, which when illuminated from beneath, rose to ephemeral nothingness near the ceiling. I have continued cultivating and experimented with the imaginal potential of kombucha for more than ten years.

In China, the recipe has about a hundred different names including Manchurian tea, Kargasok tea, Cajnii grib, Hogo, Mo Gu and Divine Che. Worldwide, it is often given as a gift, because it doubles its production capacity every fortnight, earning it the name 'le champignon de la charité' or the 'fungus of charity' (Thomson, n.d.).

The first recordings of its consumption date back to 220 BCE in Manchuria from where it spread throughout the Far East, Pacific, India, Russia, Germany and eventually the whole of Europe and, more recently, to Africa and beyond.

Stuart Thomson (n.d: n.p.n.) the director of the Gaia Research Institute of South Africa,[59] maintains that kombucha is a zoogleal mat[60] which is a near-lichen symbiosis of beneficent non-toxic fission yeast cells and bacterium and suitable for therapeutic purposes, as they fight a number of disease organisms. Following Thomson, the use of this liquid tonic declined during the Second World War when households let their cultures die, as the sugar and tea needed to sustain them were either unavailable, or very expensive.

Kombucha's liquid medium (tea kvass) and mass (zooglea) or *medusomyces gisevii lindau*, its botanical name, has been widely

[59] See https://www.gaiaresearch.co.za/kombucha.html

[60] Zoogleal is a Greek reference to 'living glue'. It refers to the slimy biofilm that forms in a group of microorganisms where cells adhere to each other by embedding themselves with a self-produced matrix. Following Stedman's Medical Dictionary (1990:1749), zooglea is an old term for a mass of bacteria held together by a clear gelatinous substance.

investigated, because many early observations indicated that it displayed antibiotic (bactericidal and bacteriostatic) properties necessary to combat disease organisms. As such, it was used therapeutically in both human and veterinary medicine. Medical research, particular German and Russian researchers such as Muller and Markarjan (Thomson, n.d: n.p.n.) have documented Kombucha as an intestinal regulator, positively contributing to establishing its efficacy in regulating digestive disturbances, constipation, haemorrhoids, kidney stones, gall bladder problems, diabetes, arteriosclerosis, cholesterol, high blood pressure, angina, gout gouty eczema, arthritis, rheumatism, atherosclerosis, irritability, anxiety, headaches, dizziness, fatigue and/or tiredness.

However, in the mid-20th century, kombucha became an official pharmacopoeia, when its numerous invigorating qualities went on record. Russian research conducted into infectious wound healing, among other maladies, continues today, while it has also been investigated by cancer researchers, among other research disciplines, and is increasingly acknowledged for its dietary and preventative benefits.

Following Thomson, Barbancik published a book in 1958 devoted to the subject entitled *The Tea Mushroom and Its Therapeutic Properties.* Literature compilations in German followed, and Thomson's review entitled *Kombucha' Green Tea Symbiont: A scientific Health Literature Review* provides fascinating reading.

Specifically, green tea provides all the composites for growth required by the kombucha culture, including important stimulant components, like caffeine and theophylline, which belong to the purine groups required by micro-organisms as a source of nitrogen from which they build nucleic acids. This insight explains why the caffeine levels decrease as

fermentation proceeds, while in symbiotic exchange, kombucha produces B-spectrum vitamins and vitamin-C and a graph (Thomson, n.d: n.p.n.) shows how sugar is first converted into glucose, then following reactions with the tea, produces healthy organic acids. The duration of the process is subject to the ambient temperature as it grows more rapidly in warmer weather.

In my studio

I considered the yeast cell aggregations growing in the vitrine as analogous to 'self-symbiosis' and/or conscious self-development, and therefore capable of leading my studio practice. However, there were times, many times, when the processes engaged with generated doubt about what I was doing or attempting to achieve and because I was not following the approach traditionally used for written theses, I felt at times as though I was literally treading water and simply trying to stay afloat.

Yet, doubt, Sullivan (2005:5) maintains, is a significant, perhaps overlooked feature of Descartes' meditations on truth and reality, because in it he challenges certainty, which as a basis for reason, is a key principle in scientific enquiry and critical theorising. In *The Principles of Philosophy* Descartes writes, "…in order to examine into the truth, it is necessary once in one's life to doubt of all things, so far as this is possible" and further in his *The Search for the Truth by the light of Nature,* the Greek mathematician and astronomer Eudoxus suggests we recognise what doubt is, so we can know what thought is, before we convince ourselves of our reasoning, saying "*I doubt therefore I am*; or, what amounts to the same, "*I think therefore I am*" (Descartes, 1968:324&219). So even while many consider Descartes' subject/object dualism central to our ecological cataclysm, he actually began his meditations with the idea of an environment in which he questioned – is this really me? How can I tell? Doubting thoughts are never far away in artistic practice, but Morton,

(2010: 95) encourages that “[t]here is more faith in honest doubt when it comes to feeling our way around…”

However, having found sufficient literary support for the ideas and medium I was engaging with in my studio praxis, I persevered with growing and experimenting with the kombucha as a medium analogous of subjective symbiosis and therefore relevant to ideas on consciousness as a self-developmental process. In the opinion of Francis Bacon and Newton (Mitchell, 2010:95-96) a ‘medium’ is a signifying material space capable of facilitating the transmission of something between two points. Sullivan (2005: xix) refers to this as “transcognition”, but Mitchell reports that the more 18th and early 19th century philosophers used the term ‘medium’ to refer to the human body and its processes, the more a sense of something that grows or mysteriously generates another aspect or dynamic, developed.

Georg Hegel persuasively argued against any notion of an autonomous, self-conscious individual (McAfee, 2004: 2), proposing that art represents a ‘medium’, because the processes it engages with can summon self-reflexivity and participation in the prevailing spirit *(Geist).* Hegel contended (cited in Glynn, 2005: 364) that “self-consciousness exists in itself and for itself, in that, and by the fact that it exists for another self-consciousness”. In other words, Hegel is claiming subjectivity’s self-consciousness of itself, because ‘conscious’, derived as it is from ‘together’ or ‘with’, *presupposes* the existence of other self-conscious subjects. Following Glynn, ‘others’ are always and irreducibly a part of me, because, as Ricœur sees it (cited in Glynn, 2005: 365) “we understand ourselves only by a long detour of the signs of humanity deposited in cultural works” In other words, Ricoeur questions whether it is possible for any individual to know anything, if understandings such as love, hate and moral feelings in general, are not articulated in some form of language, whether spoken, written, visual, or otherwise.

As such, the tireless search conducted in this praxis, represents what the artist Jayne Dyer calls a “seam line of need that you feel you want to explore or deal with” (cited in Sullivan, 2005:141). While she agrees that sometimes we make simple things complex, she acknowledges that researching methods capable of developing cognitive processes that inform and shape art practice, is itself a very complex undertaking.

This is so because art practices are not reducible to the linear cause and effect approaches adopted in most scientific endeavours and Dyer (cited in Sullivan 2005:146-147) exclaims the importance of investing time and energy researching the confluences of mind and matter. While such processes are messy, they are sometimes also magical, and following Maxine Greene (cited in Sullivan, 2005:147), “should not discourage us from going beyond our self and making appropriate use of opportunities”.

Aggregations – towards the video as an artist’s diary

Diaries record all manner of important information, and while I consider personal diaries much like personal consciousness, recording and holding significant information uppermost in an individual’s memory, I used my hand-written studio diary to record everything from camera settings to the feeding schedule of the yeast cells, including feeling-intonations and the thoughts accompanying them, as I contemplated the cellular symbiosis in the vitrine. My diary was my one of the ‘useful things’ of my praxis that I turned to when attempting to repeat a photographic shoot to obtain additional footage. As a data-collecting tool it was a library of significant information and became a mnemonic devise in which I recorded the psychological prompts of the cellular symbiosis. As such, it contributed to how I approached the knowledge researched and became a talisman-like object in which my thoughts, feelings, and the objectives of my practice,

could shape-shift as new insights and knowledge filtered into my consciousness.

As I watched the symbiotic cellular agglutinations babbling their self-organisational story in the vitrine, I realised over time, that I was seeing something of myself. Seeing an aspect of myself remembering, as I progressively re-modelled a more contemporary understanding of *psyche,* because the yeast cells operated as mnemonic devices and the praxis developed as a process of anamnesis. Realising this, I focused on what Blakemore (2017:315) refers to as “seeing the duality of body and mind, or the physical and mental, as a feature of the way we have modelled our life worlds.”

While endeavouring to assimilate contemporary research findings, I constantly reminded myself not to project too far into the future and live a little more, as Frederick Nietzsche suggests “as though the day were here” (cited in Joseph Campbell, 2008:337). The imagery, when manipulated by stirring rapidly, increasingly evoked what Marrusich (cited in Hauser, 2008:13) refers to as “presence and the bubbling mobility of the inner body”, and having conducted much research in every attempt to understand my praxis, I increasingly experienced the sentience of being at one with the cellular concert unfolding in my studio. Even while I was never able to determine, whether I was the observer, or the observed.

In a sense, my hand-written diary came to represent a personal container of cryptic signifiers only I understand. That it holds inherent meaning for anyone else is dubious, and for this reason only a selection of pages from my studio diary are included in the catalogue as evidence of my self-in-process. This is because the video created portrays my diary and/or the visual odyssey undertaken, narrating a grander, evolutionary story to a wider audience.

Alanna Lynch (2018, n.p.m.) who also makes art from kombucha to explore the science of the Microbiome, and equally fascinated with the indispensability of microorganisms to our bodily processes and therefore our identity, created an artwork she entitled *Gut Feelings* (2018) as a series of lectures. In these lectures, the participants are invited to drink kombucha to familiarise themselves with its microorganisms.

Based in Berlin, Lynch's lectures explain how the microorganisms present in the kombucha influence the mind, and by inviting the participants to drink the kombucha she attempts to establish an arena wherein she blurs any concept of a 'self' entirely separate from others, given the role microbes present in our gut (alimentary tract) play in an 'individual's constitution. By putting their hands into the fermenting kombucha, dependant on the stage of the developing pellicle, the participants experientially feel the viscosity of the cellular substance and/or the membranous zooglea.

Together with Haraway, Barad (2012: 215-216) questions who and what it is we touch when we touch electrons, and their writings interrogate how we would feel, if via the inhuman we come to care, to feel, and respond appropriately - and their insights supported why I left the pristine inchoate kombucha solution untouched in the vitrine, presenting it only as a means of insight into wonderment. If touched, the bactericidal properties of human skin flora would contaminate the inchoate symbiosis and in all probability the symbiont would die as a result of excessive contamination, a consequence antithetical to the outcome of my praxis. Re-constituted just prior to the opening of the performance, the viewers were however afforded the opportunity to observe miniscule 'beings' mysteriously self-organising in a banal vitrine. Because my performance was an attempt to promote knowledge of microorganisms and interspecies symbiosis and because the vitrine symbolized an integral aspect of my praxis, it was considered essential to the performativity of my praxis.

‘Through a glass darkly’

I kick-started the yeast cell solution many times before embarking on photographing suitably manipulated imagery for *Dust from dust: Microorganisms and other tales. An Artist’s diary.* With every step of my praxis, I familiarised myself with the evocative potential of the symbiotic aggregations, also observing how the solution becomes jelly-like near the surface, just before it produces the skin-like pellicle. Around the same time, I observed the root-like aggregations growing downwards from the pellicle as it formed.

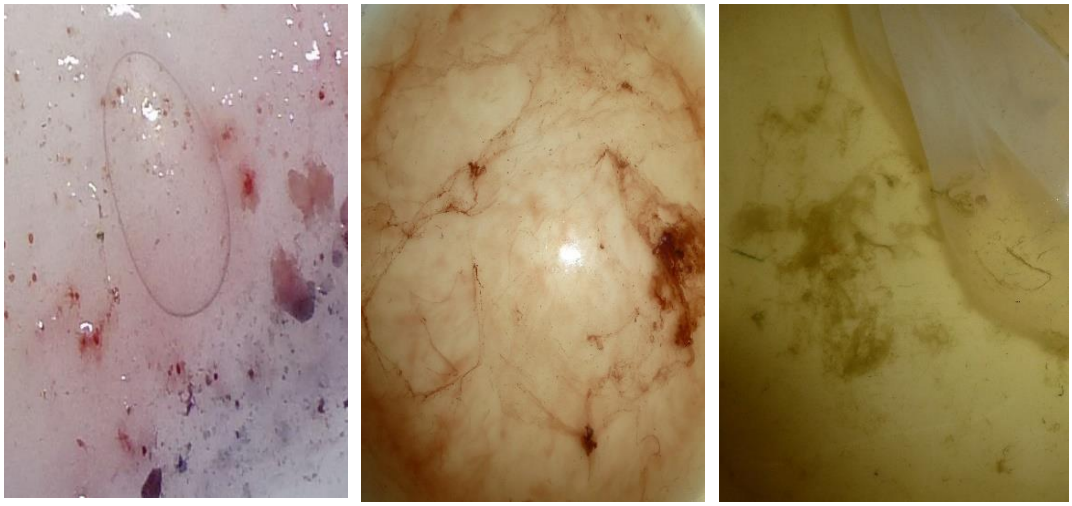

Figure 2. Beverley de Lange. *Images of zoogleal mat* (2014-2018).

I was surprised and captivated when discovering the root-like aggregations, as I had not noticed them during my Master’s project, having used large opaque containers placed on the floor of my studio, which meant that I only observed the pellicle as it developed on the surface of the liquid. Also, as the pellicle develops it grows increasingly opaque, such that even while I was primarily cultivating the skin-like pellicle, its increasing opacity concealed the root-like aggregations growing downwards into the container. I noticed the root-like aggregations in this praxis, because I had placed the cells in a glass vitrine on a table at eye level, which altered the perspective from which I previously observed the developing pellicle.

While the idea of creating a self-reflexive interface between myself and the cellular symbiosis inspired me, it initially disrupted how I envisaged my practice unfolding, and having become captivated by the root-like aggregations beneath the developing pellicle, it became necessary to digress briefly to experiment with vegetal roots, while I grappled with the subjective associations that the root-like symbiosis held captive for me.

I excavated roots everywhere, sometimes noticing roots exposed by water erosion along the side of the road and stopping to examine and photograph them. Slowly, through a process of coupling my observations and associations with challenging research, I re-charted my way back to the yeast cells and the aggregating networks forming beneath the skin-like pellicle.

Figure 3. Beverley de Lange. *Experimentation with organic roots* (2014-2018).

Figure 4. Beverley de Lange. *Roots made from symbiotic material* (20142018).

Symbiont – as skin-like or membrane-like medium

According to Jim Mooney (cited in Macleod & Holdridge, 2006:142), there are skins that cover and protect, expose and endanger, suffocate and suppress, transpire, stain, leak, retain, hold, swell, breathe and pulsate with

desire, and there are skins that perform such measures simultaneously. Mooney's notion that skin, in this instance a skin-like medium, perform multiple processes simultaneously to constitute a many-layered palimpsest[61] capable of holding its own mute history as the surface of a depth structure inspired me, as I slowly developed imaginal associations between the cellular activities in the vitrine and myself.

Coupling Mooney's suggestion (mentioned earlier) "about the moments in time when the skin of the body and the surface of an artwork merge - become one", with consciousness researcher Richard Pico's insight (2002:309, 310) "that self-development involves constructing an internal, context independent, four-dimensional mirror capable of reflecting sensory modalities" (or co-ordinates) was an idea that also resonated with me. However, Pico's suggestion (Pico, 2002:304) that "[f]rom the original living cell forward, the intracellular environment has remained the most stable part of the sensory context" motivated me, as it implies that sensory modalities use information from the past and carry it into the present. In this transformative process an idea of 'self' can manifest through the particular way an individual writes, paints and dances in intimate expressions of how he or she thinks, feels and uniquely perceives the world (Pico, 2002: 304).

This, Pico maintains (2002: 25), is because in the structure and function of the biological cell, a frame of reference survives that differs from atoms, molecules and planets, and while prebiotic cellular life displays patterns of self-organisation upon which evolution plays itself out, only once we can conceive of threshold events in nature's organisation, will we have a perspective from which we can visualise the emergence of consciousness,

[61] I use the word palimpsest in this context to refer to skin as a living manuscript. In ancient times, palimpsests were manuscripts made from animal skins scraped clean before re-use.

from the collective activity of the specialised cells making up our nervous systems.

I took interest in dancer and choreographer Yann Marrusich (cited in Hauser, 2008:13), equally fascinated by bodily processes or what he refers to as “[p]resence and the bubbling mobility of the inner body which are complementary to the image of the motionless body”. Marrusich is less interested in expressing psychological states or externalisations of consciousness than in visualising presence, but he makes use of ephemeral manifestations to realise ideas on art as “no longer about representation but about expressing continuous inner states of being and presenting them before third parties.”

So, as the cellular symbiosis grew, aggregated, fell apart and re-grew, I became increasingly more conscious of why the symbiotic processes entirely fascinated me. Envisioning Marrusich’s description of ‘body’, my body, in tandem with the symbiotic processes in the vitrine, recalled me to the ancient alchemists investigating their *prima materia,* in arguably much the same way I was investigating the cellular symbiosis.

Ancient alchemy – to conscious self-development

Following Jung (1968:427-428), one of the intentions of the ancient alchemists was to develop a *corpus subtile*, which meant fashioning a physical body that is in communion with its own spirit. However, as already mentioned, such ideas were in conflict with the religious ideology of the time and so remained private, secretive practices.

The alchemists also had no appreciation of psychology, nor any idea that terms such as ‘logos’ references an aspect of their own *psyche*. Nor did they understand the physical world as we understand it today, yet they

observed nature very closely, and for this reason projected their subjective understanding into the *prima materia* with which they worked. In their simple desire to achieve their opus and/or produce gold from the elements with which they worked, they nevertheless experienced the 'affect'[62] of projection, even while they never recognised them as projections of their own psychological background and/or life world milieu. Today, contemporary psychology considers alchemy a mystical attempt at achieving personal and/or philosophical gold.

The literature researched also suggests that the alchemists stopped just short of complete self-consciousness, as though constrained by religious limits and lack of scientific insight into how inseparably entangled we are within *psyche* as a given life world and/or milieu. Only through psychologically interpreting the projective nature of alchemical processes did Jung realise alchemy's relevance to individuation and conscious self-development. The Jungian analyst John Dourley (2011: 514), maintains that Jung claims to have preserved alchemy's numinous powers by absorbing it into psychology to liberate it from medieval ignorance, and what was to become the science of chemistry. Assimilating the writings of the alchemist Gerhard Dorn,[63] Jung came to appreciate how the *unus mundus,* the marriage of earth and heaven into 'one world', represents a conscious state of being and how (1967: 120). Johan Wolfgang Von Goethe's *Faust* represents a literary *magnum opus,* because in it he delineates the puzzling complexities conscious self-development entails.

[62] *Affect* and/or subjective bodily feelings.
[63] Dorn was a Belgium physician, philosopher, alchemist, theologian, early psychologist and advocate and editor of the writings of Paracelsus (Swiss alchemist, astronomer and physician).

The storyboard

Creating the storyboard for the stop-frame video *Dust from dust: Microorganisms and other tales. An artist's diary* required that I spend many hours replaying the photographs on the memory cards on my camera sideshow, flashing through them backwards and forwards as rapidly as possible until entirely familiar with the phases recorded over a three-year period. Once entirely familiar with the recorded content, I choreographed a narrative in which the bacterial yeast cells unfold a visualisation of conscious self-development.

I choreographed the narrative by indicating to the editor of the video, numerical image by numerical image, exactly how the narrative must unfold, and typed the instructions in clearly articulated sentences that read, for example, "copy memory card 4 till image 275 – then alternate images 275 and 276 backwards and forwards 10 times to create the effect of a 'silent heartbeat." Creating the silent heartbeat evident in the video, effectively required copying and pasting about ten consecutive images of 275 and 10 consecutive images of 276, and then repeating the process until the desired effect was achieved, because stop-frame videos require at least eight images per second for effective animation.

My artist's diary.

> Lead, as I do, the flown-away virtue back to earth – yes, back to body and life; that it may give the earth its meaning […] Nietszche (cited in Nancy, 2000: ix).

Initially the photographs taken in my studio were time-lapsed, using a camera and tripod. However, because the yeast cell aggregations grew rapidly at certain times, and the camera lens struggled to retain a consistent adequate focus, some of photographs are blurred. While I eventually switched to manually photographing the imagery as I

manipulated it, I elected to retain many of the blurred images for my visual artist's diary, because they reflected notions of the vicissitudes of conscious self-development. Perhaps the idea of 'blurring' is appropriate to any self-reflexive story, especially one attempting to give visual expression to consciousness as a self-developmental process. Because, as Jung explains (1967: 91), "personification of "things" is a remnant of primitive psychology caused by unconscious identity with the object, what Lévy-Bruhl (mentioned earlier) refers to as "participation mystique".

However, unconscious identity manifests through projecting unconscious contents into an object, as the contents then become accessible to consciousness, even while still belonging to the object. Even remotely interesting objects provoke a substantial number of projections, because as Jung explains (1967: 92) "consciousness develops in civilized man by the acquisition of knowledge and by the withdrawal of projections… when… recognized as psychic contents and […] reintegrated with the psyche" of the individual concerned. Arguably, this understanding informed Lockwood's suggestion (1998: 86) "that the sentience a thing or object captures must be subjected to conceptualisation, interpretation and identification for its meaning and/or personal implications to manifest in consciousness."

At this point in my praxis, I elected to edit the photographs into four phases and to use suitable alchemical terms to designate each phase. This was not an arbitrary decision, but based on the idea of a quaternity principle (1967: 167) as an orientating system of co-ordinates, that while unique to each individual, is expressive of becoming and/or the self-in-process, and constituted in Jungian literature, by thinking, feeling, sensation, and intuition, or the four functions of a conscious psyche and/or mind, as mentioned at the outset of Chapter One. Even while in the four phases edited, some of the photographs are blurred, some clearer, and others are

of great clarity, they all represent important moments in my praxis because they symbolically reflect personal growth and in so doing remain significant to my understanding of consciousness as a self-developmental process.

The Nigredo - ***"But such a tide as moving seems asleep"***

I re-commenced the yeast cell symbiosis many times by delicately swirling the liquid with a thin wooden dowel, as I waited for the kombucha to thicken and become slimy[64]. From previous experience, I recognised that when slimy, a zoogleal mat was forming and the symbiosis ready to form a pellicle on the surface of the liquid. Having discovered root-like agglutinations growing downwards into the vitrine, once the pellicle started forming, I began photographing the root-like aggregations through the glass of the vitrine (Figure 5) positioning a light box directly behind the vitrine to illuminate the aggregations. (Figure 1 shows the light box on top of the vitrine, but the photograph was taken during the experimental phase of my praxis but was re-positioned on the opposite side of the vitrine in an attempt to achieve greater clarity in the photographs).

[64] *"But such a tide as moving seems asleep"* - Tennyson (cited in Ferguson et al., 1996: 911).

Figure 5. Beverley de Lange. *Nigredo phase* (2014-2018).

As the sliminess of the zoogleal mat developed, I watched and waited, contemplating how the 'sliminess' of the zooglea evoked ontogenetic correlates, that while not further discussed in the project, are representative of states of being, existence, and/or becoming.

The existential philosopher, Jean-Paul Sartre (Parry, 2011:397), whose philosophical writings attempt to ground psychoanalysis in a phenomenology of the form of matter, considered 'sliminess' a quality of being that compromises true subjectivity by threatening autonomy and self-definition, because the subject is too close to 'the mother' (early symbolic reference to the unconscious aspect of mind). Sartre's writings are supported by the psychoanalytical writings of Julia Kristeva.[65]

[65] In Julia Kristeva's theory, signifying processes have two modes. In other words signifying processes are dyadic, and she refers to them separately as the semiotic mode and the symbolic mode. The semiotic refers to the extra-verbal way in which bodily energy and affects make their way into language. Conversely, the symbolic is a signifying process that depends on language as a sign system. While the expressions of scientists are

As the zoogleal mat formed, I intensely observed what I regarded as my *prima materia*, attempting to uncover psychological/ontological associations that might provide a clue as to how to proceed on this seemingly uncharted odyssey. As already mentioned, the *prima materia* was the ancient alchemist's unique and secret substance, and they referred to it by literally thousands of terms. However, one of their terms 'spiritual blood', consciously resonated with me, and because the only difference between a state that is conscious and one that is unconscious is the difference between a state accompanied by a thought [and/or feeling] about itself and one that is not (Wider, 1997:104), I recognised the term 'spiritual blood' as an inference to a bodily feeling state.

Jung (1967:86) interprets *prima materia* as "radical moisture", an ancient Greek medical reference to a fourth element needed to complement the three bodily elements of "vital force", "innate heat" and "thymus" (spirit). The Greeks believed "radical moisture" was a form of 'divine' water (Jung, 1967: 67) required to transform living tissue in the organism concerned. While its physical properties apparently resembled Royal Jelly, it was considered a necessary ingredient for the process they referred to as "squaring the circle"[66] or "creating a quaternity",[67] an abstract synonym for the idea of creating a 'vessel' considered necessary to carry the soul, which they envisioned as belonging to the individual's own body.

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examples of symbolic language, expressions in music, poetry, dance etc. are examples of semiotic processes (McAfee, 2004: 17).

[66] Squaring of the circle occupied the medieval mind. They considered it an attempt to break down the original chaotic unity into four elements and then to re-combine them in a higher unity or consciousness.

[67] In Jungian literature, a quaternity is an archetypal pattern capable of representing the arrangement of synergised functions of the conscious mind and, according to Edinger (1996:183) it is a parallel reference to the concept of a self.

Psychologically, creating a vessel implies an inner readiness to recognise and receive the archetype or original unconscious pattern of wholeness that Jung refers to as the 'self' (1967:86-87). However, he maintains that , it is also necessary for the subject to construct the form in which the archetype presents itself, because as it carries within it projections of an autonomous psyche, it differs from one individual to the next (Jung, 1968:317).

Taking photographs during the *Nigredo* phase was very challenging. The camera settings required continuous adjusting to record the sequences and the footage required extensive editing to attain even a degree of clarity. As already mentioned, I eventually abandoned a time-lapse approach and manually manipulated the aggregations when photographing the later sequences. While the photographs taken presented a myriad associations, selecting the most appropriate imagery for each alchemical phase was necessary to achieve the narrative of the video, because as Stéphane Dumas explains,

> [t]he representation we have of the world, and of ourselves as part of it only exists through a tension with something that is not of the order of representation, something unnameable located either this side or the other side of our spectrum of representation […] something that escapes any preordained meaning or carving in stone (Hauser, 2008:23).

Criticising traditional philosophy's neglect of emotions and feelings in *Being and Time* Heidegger elaborates on how in the 'traditional view', the meaning of being is somewhat disconnected from feelings and/or affects (Ratcliffe, 2002: 287). Inthe 'traditional view' affects and emotionsare regarded as interfering with consciousness and objectivity and positioned as 'psychical' or 'accompanying' phenomena,. In other words, they are superficial affects only peripherally necessary to any understanding of our engagement with our life world milieu. This 'however' is countered by

Massumi (cited in Hsieh, 2008: 224), who, in support of Heidegger, suggests that “[a]ffect *is* the whole world”.

The photographs selected for the *Nigredo* phase are dark, shadowy and blurred as they represent *massa confusa* or chaos, the Western equivalent of the Nigredo; black on the outside, and white on the inside (Jung, 1067: 325). Even while there is always a tiny element in each photograph that is crystal clear, as the camera constantly searches for something in the foreground to focus on, however minute, the imagery in the vitrine when photographing this phase was chaotic. According to the symbolist and art critic, Juan Eduardo Cirlot (2002:57), black, and by association darkness, represents germinal stages in a process. Jung (1977: 229) explains that psychologically, this phase can be interpreted as confusion and/or anamnesis and in this sense, regardless of the clarity of the imagery, I considered the photographs suitably representative of the *Nigredo,* or early stage of conscious self-development. During the *Nigredo* phase, yeast cells are seen wafting around seemingly without purpose, only randomly agglutinating here and there.

Some of the earliest photographs selected to choreograph the *Nigredo* phase evoke a darkened landscape. However, as the liquid clarifies the developing agglutinations become increasingly visceral and at times entail-like agglutinations float towards the surface of the vitrine, embedding themselves within the pellicle developing on the surface of the liquid.

Given time, the kombucha fermentation, if not agitated, clears naturally, and once this happened, I began actively transitioning the dark *nigredo* phase into a greenish hue. I did this by infusing minute quantities of vegetable dye, either directly into the vitrine itself, or manually removing zooglea from the vitrine and placing it in a petri dish or saucer with vegetable dye for a few seconds. Vegetable dye is assimilated very rapidly

by the gelatinous-like zooglea, but the colour can be reduced by gently washing the zooglea with tap water.

Transitioning from the *nigredo* phase introduces the idea of movement, rotation and the 'dynamicness' of consciousness as a self-developmental process. Constant self-transitioning is arguably a necessary aspect of this dynamic as it helps keep the psycho-spiritual aspects of consciousness moving forward. With the emergence of the *viriditas* phase, which recalls notions photosynthesis, the subsequent alchemical phase of the video begins.

The Viriditas - *"I remember long veils of green rain … [g]reen from the half green of the spring trees"*

I refer to the second phase[68] of the video as the *Viriditas* because viridian, as a transitional colour on the colour wheel, is not quite green and not quite blue, yet more green than blue. As such, it occupies a position close to the centre of the seven-coloured spectrum of light. While following Cirlot (2002: 55), green (in early Christian art) came to symbolise centering or unification between oppositional poles (heaven and earth) within an individual being, as a colour it is generally associated with growth, freshness, vigour, including balance, among other associations. Because red is the opposite of green, the *rubedo* follows the *viriditas* phase in the video, representative of the third and counter phase of the *vitiditas,* and also its complement.

[68] *"I remember long veils of green rain … [g]reen from the half green of the spring trees"* - Livesay (cited in Ferguson et al. 1996: 1396).

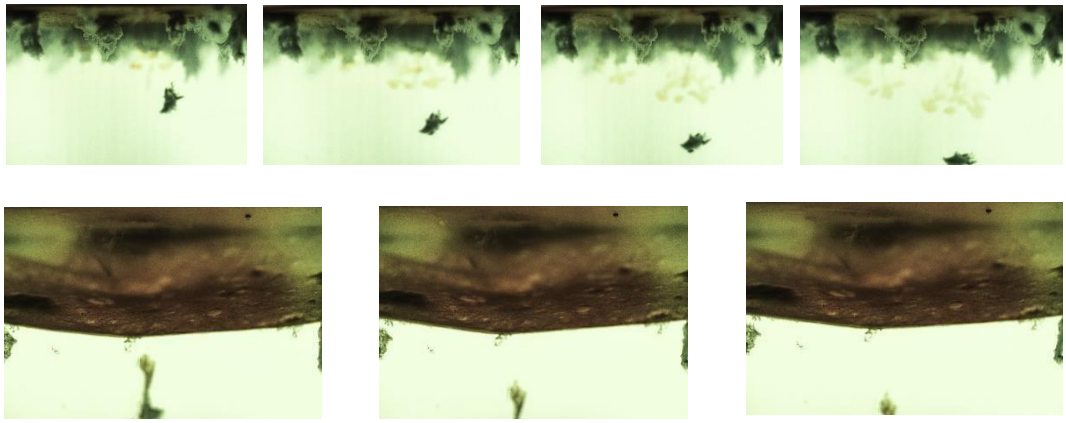

Figure 6. Beverley de Lange. *Time-lapsed sequences of Viriditas phase* (2014 - 2018).

During the *viriditas* phase, I invested a huge amount of time watching and contemplating the myriad activities unfolding in the vitrine, attempting to garner subjective associations held captive by the imagery. The philosopher/physicist John Wheeler, who worked alongside Bohr and coined the terms 'worm holes' and 'black holes', refers to a praxis of such contemplative engagement as "a participatory universe observing itself…". [69] Interestingly, Kauffman (2014: 167) explains this as, differentiation between a conscious "responsibly deciding" universe by quantum variables upon measurement, and a "knowing" quantum coherent state that is unconscious.

I was entirely captivated by the imagery unfolding in front of me, finding it so compelling that it interfered with my work time-frames and/or ability to concentrate on the work of my livelihood. During the *viriditas* phase the cellular growths were slower than in the *Nigredo* phase, as the rate of growth is influenced by the time of year and the ambient temperature in my

[69] Stuart Kauffman compares Wheeler's '*participatory universe observing itself*' to the idea of a '*responsibly deciding'* universe and a '*knowing*' quantum coherent state that is not conscious (2014: 167).

studio. The sugar quotient in the kombucha liquid and the pH[70] of the solution are also influential.

When replaying the photographs backwards and forwards on my camera sideshow, the speed at which the photographs flashed, so invigorated the primordial-like imagery, that it created an aura of movement and bubbling, lively mobility. As my photographic abilities developed, I became more adept at adjusting the camera settings, which meant I could manage to manipulate and photograph without the assistance of a more competent photographer. At times, I amplified the suggestiveness of the imagery, by blowing air into the kombucha liquid through a long plastic tube, literally dancing and breathing with the cellular symbiosis.

At other times it was necessary to hold my breath when peering into the vitrine as I manipulated the imagery, extremely conscious that even the slightest untimely breath would disrupt the delicate gossamer-like aggregations and they would detach from the fragile pellicle at the surface and descend to the bottom of the vitrine outside the photographic field. The thin wooden dowel used, when coupled with sufficient arm length and deft-like speed, helped make simultaneous manipulation and photography of the yeast cell formations possible.

At this point in my praxis, I recognised that it was no longer meaningful to merely contemplate the yeast cell processes, in fact, contemplation alone seemed too passive. I also deemed leaving the symbiosis undisturbed and merely photographing the evocative beauty of the cellular formations antithetical to the active intention of embodying a more contemporary understanding consciousness as a self-developmental process. Were I to leave the symbiosis undisturbed, the pellicle on the surface of the

[70] In chemistry the pH of a solution indicates the acidity or alkalinity of a water-based solution. The lower the pH is the more acidic the solution.

kombucha solution would simply grow thicker and thicker and present much like poorly vascularised tissue, the colour of body fat.

I discovered also that the more I participated in the process by disrupting and manipulating the aggregations (which at times were no more than gossamer-like plumes of zooglea), the more confident I became of realising the objectives and intentions of the praxis. All the while, the yeast cell aggregations, like scribbles and re-visions in a diary, re-organised themselves following disruptions, and I continued researching and developing a more enlightened understanding of life as processual.

The developing cellular aggregations contributed towards an understanding of Elizabeth Bishop's poem that I identified with. According to Palmieri (2008, n.p.n.), Bishop's poem *'In the waiting room'* iterates the lines *"…I didn't have any word for it"* and again "[t]hen I was back in it" and Palmieri questions whether Bishop uses the word *"it"* in the same way the philosopher Eric Voegelin (cited in Palmieri, 2008: n.p.n.) uses the linguistic term *"it-reality"*, that is, to reference a primordial field of reality, which as a metaxy,[71] or an 'in-between' space, is capable of balancing consciousness and grounding an individual in a subjectively harmonised state of being. Following Voegelin, 'it-reality'

> …encompasses its tensional pole of thing-reality and is never to be split off from it, [as it] includes among the 'things' comprehended the bodily located consciousness that, reflecting on its own intentional and imaginative search within reality, becomes aware of itself as part of the greater, comprehending reality […] (cited in Palmieri, 2008: n.p.n.).

As such, the *viriditas* phase played a somewhat different role from the slimy *nigredo* phase, where the imagery is blurred and difficult to delineate.

[71] In Plato's Symposium, the term metaxy is defined via the character of the Priestess Diotima to reference something 'inbetween' and/or a 'middle ground'.

During the *viriditas* the liquid clarifies, becoming plasma-like and evocative of photosynthesis, the process whereby plants and other organisms convert light into chemical energy.

As the visceral forms absorb the green dye (added to the zooglea either in a petri dish or infused directly into the kombucha liquid) they grow darker green, as here and there agglutinations spontaneously disconnect from the surface pellicle and descend to the bottom of the vitrine. At other times, small clusters of agglutinations ascend from the bottom of the vitrine and, buoyed upwards by air bubbles, join the agglutinating pellicle at the surface of the liquid.

After a while, if the hue is not further manipulated, the *viriditas* phase progressively clarifies and once this transpired, again using minute quantities of red vegetable dye, I transitioned the agglutinations to a pinkish blush. By progressively increasing the amount of red dye infused, photographing at the same time, the blush grows ever deeper until a blood-like redness signifies the dawn of the *rubedo,* the counter and complementary phase of the *viriditas*.

The Rubedo - *"Red … embraced my body's whiteness [and] cutting into me [it] carved [me] free"*

As I watched the greenness of the *viriditas* recede and the pinkish blush of the *rubedo* intensify into a vascular flush, I introduced fresh red[72] and green zoogleal agglutinations to the vitrine (having manipulated their colour in a petri dish).[73] Then once again, with wooden dowel in hand, and my

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[72] *"Red … embraced my body's whiteness [and] cutting into me [it] carved [me] free"* - MacPherson (cited in Ferguson et al., 1996: 1720).

[73] Some of the imagery achieved took days, weeks even months to photograph. Some sequences were recorded more than once to achieve extra footage. These processes involved separating the delicate gossamer-like wafers of symbiotic agglutinations and then re-joining them in such a way that the imagery achieved, evoked what I was attempting to

camera in the other, I agitated the kombucha liquid and photographed the dynamic established between the two different colours. In other words, I deliberately created an interface of opposites to contemplate and participate by photographing how they slowly merged/separated, entangled/disentangled, located/dislocated/relocated[74] in a dyadic dance that folded, unfolded, and enfolded on itself.

visually articulate. Both the forming vesicle and the heart-like structure seen in the video, where fluid moves and falls between the membranous layers, are examples of extremely delicate manipulation. While these manipulations were intentional, very little of the process could be entirely controlled. Needless to say, I photographed what unfolded in front of me and then choreographed the video from the most suitable imagery. Through this creative-practice-as-research undertaking I was able to recognise how much 'visually' focusing on an idea, contributes to the embodiment of knowledge.

[74] The South African artist Leora Faber produced an artwork entitled "Dis-location/Re-location". While a work that explores collective alienation and identity in South Africa, it is, following Law-Viljoen (2008:4) a work of "unremitting interiority".

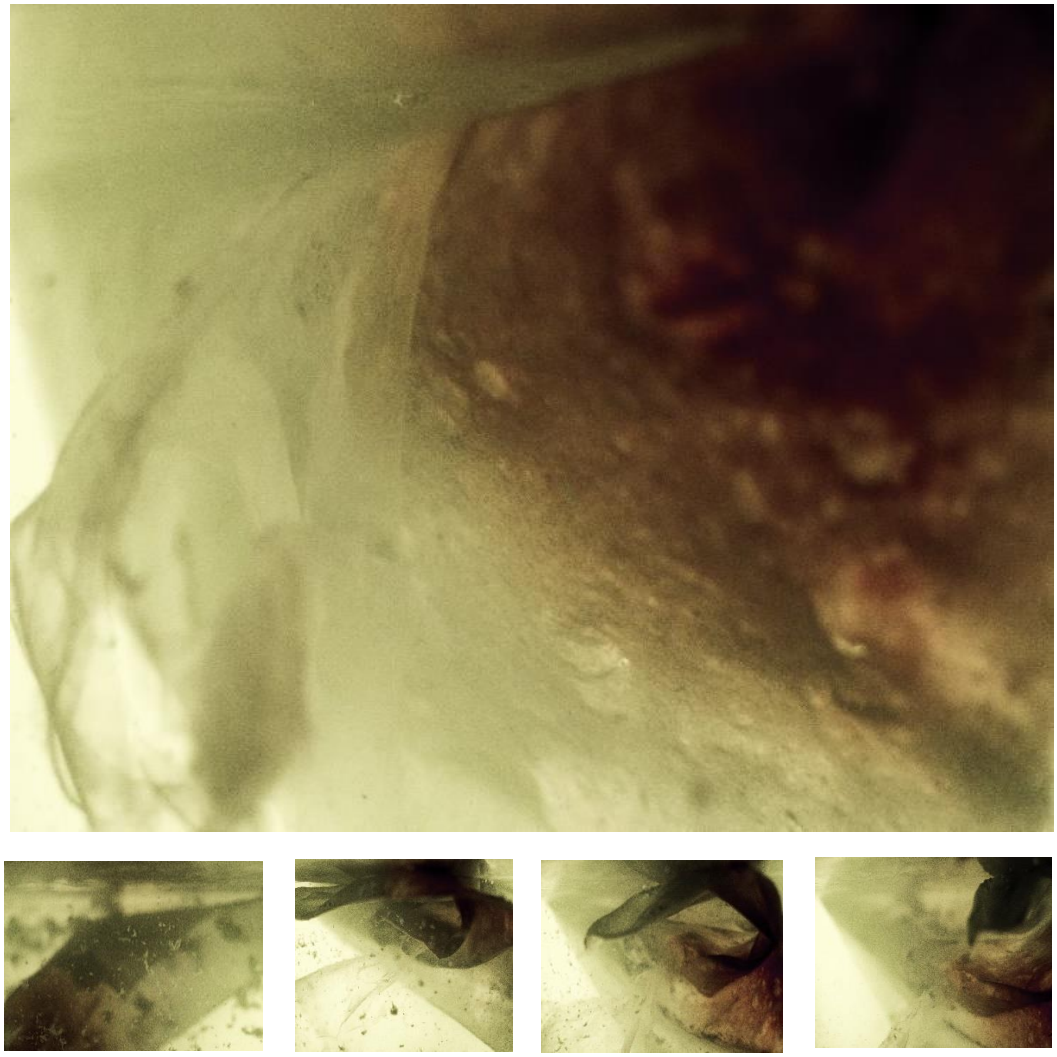
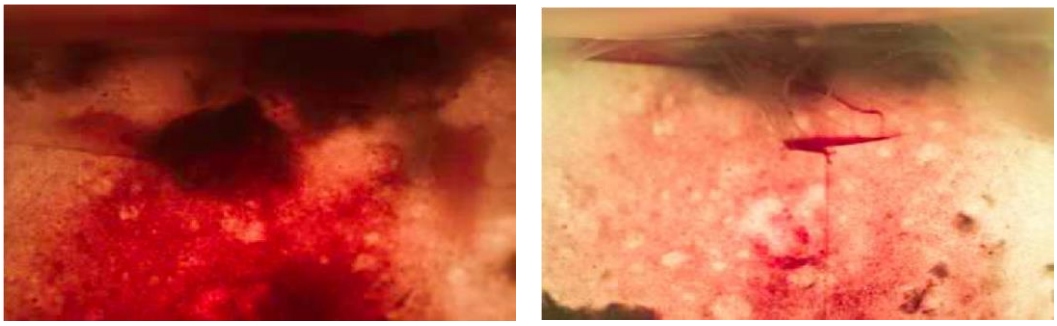


Figure 7. Beverley de Lange. *Viriditas phase transitioning into Rubedo phase* (2014-2018).



Figures 8 and 9. Beverley de Lange. *The Rubedo Phase* (2014-2018).

As the *rubedo* phase develops, it intensifies into fiery furnace-like imagery. I achieved the molten/crucible-like effects by using red-coloured ice cubes, which when momentarily held by the electromagnetism of the fragile zooglea, rapidly dissolve to liquid while tracking a route through the membranous zooglea, before gravitating to the bottom of the vitrine and dissipating into the surrounding liquid.

The imagery photographed for the *rubedo* phase was a conscious attempt to both create and experience inner oppositions and/or complements, and by manipulating the green/red gossamer-like pellicle in this phase of the video, I gained insight into Jung's interpretation of the *coincidentia oppositorum.* Coincidentia oppositorum is a psychological term Jung used to designate a unification of opposites, or as reviewer Helene Kastinger Riley (2003: 192) refers to it, "essenceless essence", or "essence under erasure". While "unification of opposites" implies conscious self-development, Jung considers that a physical medium is necessary to mediate the transitions (Jung, 1977: 460-461).

The photographs selected to choreograph the *rubedo* phase of the video arguably evoke membranes cleaving apart and fiery molten forms dissolving and falling within the photographic field. As the agitated imagery moves and swirls, many of the agglutinations detach from one another and the green of the *viriditas* and the red of the *rubedo* twist, turn and touch in movements redolent of an embrace. Primal redolence of a looping together of feeling and reason was an attempt to signify my own body "in-formation" (Jude Currivan, 2017:233) and project the embodied assimilation of contemporary knowledge constituent with the intentions of my praxis. As the swirling eddies continue and bi-coloured membranes blend, a small

viscus [75] appears in the video through which blood-coloured liquid (kombucha) continuously flows.

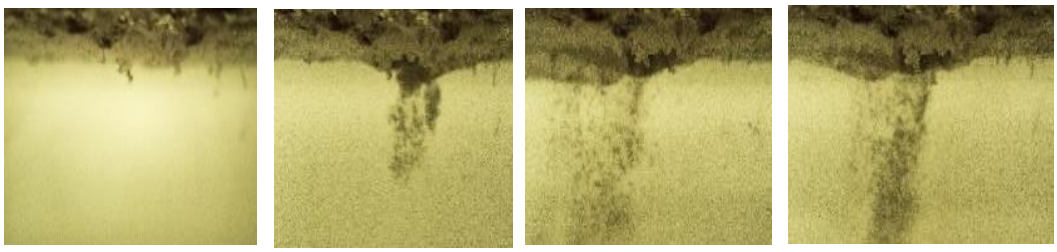


Figure 10. Beverley de Lange. *Time-lapsed sequence as symbiotic liquid begins to clarify* (2014-2018).

The Albedo – *"Now sleeps the crimson petal, now the white"*

In ancient alchemy, the *albedo*[76] is referred to the phase of whitening because it represented washing and/or the purification of substances from which the alchemists were endeavouring to produce gold. Whereas symbolically, black is a colour signifying the absence of light, white, as it's opposite, combines all the colours of the visible light spectrum. In astrophysics 'albedo' refers to the whiteness or reflective potential of a planet, and religiously it is variously translated through re-birth ceremonies, with Christian baptism a good example. The initially blue, now white wedding dress of traditional Western marriage ceremonies also symbolises a phase of transition in an individual's life world environment.

[75] In biology, a viscus refers to a group of tissues such as the heart that unite for a common purpose.
[76] *"Now sleeps the crimson petal, now the white"* - Tennyson (cited in Ferguson et al., 1996: 898).

Figure 11. Beverley de Lange. *Still images of the Albedo phase* (2014-2018).

While I positioned the *albedo* phase as the last phase for the video, it signified the emergence of a new and different understanding of consciousness and/or embodied self-development. All four phases were set to run on a loop in the video and performance as neither transition, nor its relevance to life as a continuous process, is ever considered complete or separated from other-beings-in-the-world.

From this creative practice-as research undertaking, and after much contemplative participation while growing, manipulating, choreography and editing processes, new insights did emerge, and with them, I experienced a certain 'lightness of being'. A feeling state that came in sharp contrast to the somewhat tamasic feelings encountered at the start of my practice, when an overwhelming amount of work and uncharted journey still lay ahead of me.

In the video, the imagery selected to choreograph the transition to the *albedo* phase reflects 'lightness of being' in the translucency and aerial-like vestiges that waft across the screen. This phase of the process was choreographed to also include simulations of vasculature and blood vessel-like imagery that emphasise how much consciousness, as a living,

biological process, grows, unfolds and embodies itself as self-development transpires.

Towards performing conscious self-development

UNISA students have the Meuckleneuck campus's art gallery at their disposal in April and September of every year and I considered it fortunate that I elected to exhibit in April 2018, because as it happened, only one other student was exhibiting at the same time, and the nature of my exhibition required far more space than initially imagined.

While I had I envisaged creating a four-walled cube (quaternity) inside the huge exhibition arena using three of the moveable gallery walls and having a fourth 'dry' wall constructed, realistically, as a student living over a thousand kilometres from Unisa, only a three-walled enclosure was achievable given the difficulties and cost implications. However, by enveloping the vitrine in an opposing and/or complementary three-walled enclosure in the gallery space, leaving space between the two components of the performance open for spectators to move in, a suitable set of "co-ordinates" was established.[77] As Greenstein and Zajonc (cited in Barad, 2012: 215) suggest

> [h]idden behind the discrete and independent objects of the sense world is an entangled realm, in which the simple notions of identity and locality no longer apply. We may not notice the intimate relationships common to that level of existence, but, regardless of our blindness, to them, they persist… Behind the indifference of the macroscopic world, 'passion at a distance' knits everything together.

[77] One could argue, following David Bohm, that the video 'unfolded' within the gallery space, while the invisible activity within the vitrine, 'enfolded', with each representing a complementary facet of a dyadic, interconnected relationship.

As a performance of ‘co-ordinates’, the opposing/complementing enclosures proved satisfactory, as when setting up the exhibition the three projectors required to project the video macroscopically into the three-walled enclosure (four walls would have required four projectors), cast huge shadows onto the walls and surrounding imagery, when projecting from inside the enclosure. While ‘shadows of technology’ tell their own story, had I constructed a four-walled enclosure, the projector problem would have been difficult to resolve. However, because it was possible to move the projectors far out of the enclosure without compromising another student’s exhibition, and project into the enclosure from beyond the three walled enclosure, we eliminated the shadow problem.

Another technical difficulty experienced when installing the performance was bringing the three projected videos into perfect alignment across the moveable walls. The suspended projectors each ran an identical DVD version of the video, but different phases of the same video ran on each loop, and unlike in Pipilotti Rist’s video *Ever is over all*[78]*,* where projections of colour and sound deliberately overlap, an attempt was made to align the footage at the top and bottom of each wall. This alignment took the gallery staff hours of creativity and technical insight to resolve. However, because the walls are moveable, they are not entirely stable, and all movement, even moving air, disrupted the perfect alignment at times.

Unfortunately, while assured of new, more suitable projectors, they were not yet available in time for the performance, and the ones available proved of inadequate resolution. As such, the macroscopic projections were not as sharp or vivid as required. While every attempt was made to keep the light shining through the glass doors of the adjoining foyer off, darkening the area sufficiently remained a problem. However, the clarity of the imagery on the two computer screens displaying the video in the

[78] See https://m.youtube.com/watch?v=a56RPZ_cbdc

opposing darkened three-walled enclosure, were of a much improved resolution.

Once the alignment (projector/projection problems) were suitably resolved, those of us involved in setting up the performance, cast relatively small shadows on the walls on entering the projection enclosure. I had anticipated human shadows, even considering them integral to the intentions of the inter-subjective, inter-species interface created in the performance. What I did not anticipate 'however' was how the projected imagery would incorporate the spectator's body as he/she entered the enclosure, absorbing him/her into the projections. It could be argued, that to the extent that the spectator merged with the imagery, experiences of immersion were made possible.

On a personal level, I experienced the human shadows as somewhat disruptive of the pristine footage I had nurtured, grown, manipulated photographed, choreographed, edited and become acquainted with over a three-year period. The experiences of dissonance came in contrast to the sentience of the primordial beauty of the symbiosis, observed during my praxis. However, it was neither pleasant nor unpleasant, I was simply conscious of it and of how it much it contributed to my understanding of consciousness as a self-developmental being-in-the-world-with-others process.

In *New Philosophy for New Media,* theorist Mark Hansen (Angerer, 2011:220) explains that the site of the exhibition as well as the viewer's body can compensate for the frameless quality of images in a performance such as *Dust from dust.* In other words, because the performance encapsulated the viewer, the framing happened in and through their own bodies as they became immersed within the macroscopic/microscopic opposites/complements of the spectacle, and their bodies, as porous

boundaries and/or thresholds, became exposed to the sentience of the symbiotic encounter. As Sartre observes (Reason, 2006:217), "[a]n audience is primarily an assembly […] [where] each member of an audience ask[s] himself what he thinks […] and at the same time what his neighbour is thinking", a statement which suggests that the performance incorporated notions of self/other inter-subjectivity.

As such, the presence of the glass vitrine that was instrumental to my praxis, was a critical element in the performance of *Dust from dust: Microorganisms and other tales. An Artist's diary*. Installed in a darkened end of the gallery enclosure on a base of black polystyrene, its oppositional placement offset and complemented the white-walled enclosure in a deliberate attempt at establishing a personal set of co-ordinates, and/or dynamic coessence's in a performance. Coessence's that reflect microscopic/macroscopic, dark/light, self/other, unconscious/conscious, complex/simple etc. because as Nancy puts it (2000:37),

> …coessence puts essence itself in the hyphenation - 'being-singular-plural' - which is a mark of union and also a mark of division, a mark of sharing that effaces itself, leaving each term to its isolation and its being-with-the-others'.

Further, Nancy argues, that the unity of an ontology (state of being), must be sought in this dynamic, in drawing out, distancing and spacing, which while relevant to being itself, is at the same time, relevant to the singular and to the plural (2000: 37).

Interestingly, when the vitrine was initially constructed, it included a concave glass dome in its interior, intended to accommodate the camera, as I initially envisioned live streaming the photographs of the symbiotic processes from beneath the vitrine. This was 'however' not possible, as I soon realised that the dome reflected light, and because the photographs 'flattened' the imagery, the root-like symbiosis recognised at the start of the

project, was not intelligible as ‘roots’ in the photographs. As mentioned, there were also multiple problems with loss of focus using time-lapsed photography, and having decided to manually photograph the formations through the side of the vitrine, I simply added extra fluid/kombucha and adjusted the tripod and camera to the new fluid level so that the root-like aggregations attaching to the forming pellicle, shifted higher up in the vitrine and eliminated the dome from the photographic field.

However, when the vitrine was positioned in the gallery, the dome provided an additional means of fascination, as I was able to connect a tiny flicker light, attached to a power source, and place it inside the dome. The black polystyrene base had been modified to accommodate the light and lead beforehand and once in place the flicker light gently illuminated the freshly commenced symbiosis from below. The tiny flickering light, more visible in the darkened end of the gallery, dramatised the performance by drawing the spectators to the ‘mystifying’ contents in the vitrine.

Because the symbiosis was freshly constituted the evening before the performance, by the following morning a waif-like pellicle had self-organised over the kombucha liquid in the vitrine. Illuminated only by the tiniest flicker of light, the vitrine’s performed its own presence silently, and as the yeast cells continued to self-organise over the two weeks that followed the performance, the pellicle grew thicker and thicker. However, without the nutrients required, over time the symbiosis would slow down, and the pellicle deteriorate and die.

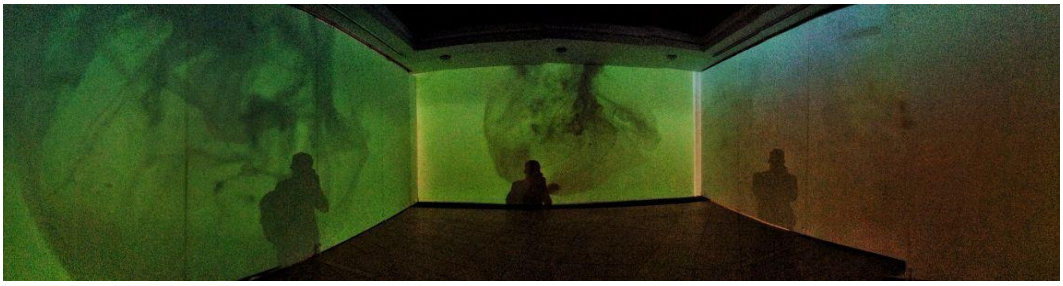


Figure 12. Beverley de Lange. *The exhibition – Dust from dust: Microorganisms and other tales. An Artist's diary* (2014-2018).

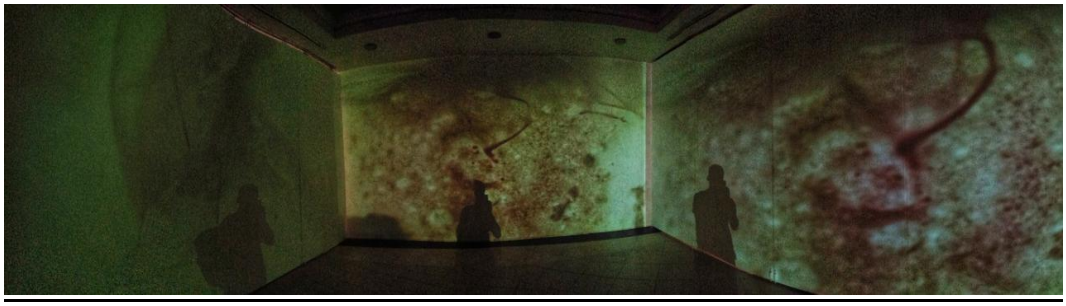


Figure 13. Beverley de Lange. *The exhibition – Dust from dust: Microorganisms and other tales. An Artist's diary* (2014-2018).

In many ways, the video and the vitrine narrated the contents of my diary on my behalf. So as the viewer's co-mingled, in darkened silence, endeavouring to fathom the vicarious facets of the performance and curious imagery surrounding them, the yeast cells iterated their story - about things at the heart of things,

> the same heart for all things […] for everything: an absolutely singular, local, restraint, fugitive and tenacious. A position, a disposition, an exposition against which thought comes up short, off which it ricochets: that there is something there, and still something else, the thing itself, at the heart of this thing (Nancy 1993: 167).

As such, the performance provided a conscious means of expressing a singular experience of finite being, being unto death as the "the ownmost possibility of *Dasein*" (Heidegger, 2010:252), and the paradoxical mystery of feeling processes that accompany such experiences.

CHAPTER FOUR

A brief introduction

Come to the edge, he said
We can't, we're afraid they responded
Come to the edge, he said
We can't we will fall, they responded
And they came
And he pushed them
And …[79]

Self-reflexive visual performances can evolve from creative practice-as-research undertakings and represent the outcome of an ongoing self-process at a particular point in time. As such, they often come to represent neither finished projects nor finite products and I emphasise this in this document. I also explain how unconventional and/or untraditional my approach to the research undertaking has been and draw attention to how the written text and stop-frame video projected into the performance, records the re-visiting, re-searching and re-doing requisite of practice-as-research undertakings. An undertaking in which I explored consciousness as a continuous biological process of self-organisation because I considered such a praxis capable of leading to an embodied understanding of consciousness as a self-developmental process.

To complement the lengthy introduction, the conclusion is brief, only encapsulating the germane aspects of the praxis as explained throughout the text. Consistent with the rest of the document, I present the contents of chapter four in a similarly unconventional manner.

[79] *Come to the Edge* by Christopher Logue (1981: 96) is often incorrectly attributed to Guillaume Appollainare but it was dedicated to him.

Chapter overview

In Chapter One, I introduced insights capable of guiding the reader to an interpretation of the conscious/unconscious mind, psyche/self as primordial wholeness within every individual being and/or organism. I introduced a Jungian interpretation of the feeling function of consciousness focused on in my Master's project, before discussing how projection, the withdrawal of projection, and/or introjection of previously projected psychological contents, influence self-organisation and conscious self-development. I cited Kristeva and others to support my argument on how the symbolic structures the subject.

Chapter One primarily focuses on literature researched prior to initiating my studio praxis for the project and is presented 'in depth' to afford an appreciation of the discernments gained and the feeling-toned focus of the project as a whole. Drawing strongly on the neuroscientific writings of Antonio Damasio, Chapter One offers contemporary insights into how 'objects' in an individual's life world environment, constitute 'psychological images' and/or symbols. I highlight conscious/unconscious, symbolic/semiotic processes to ground consciousness as a biological, self-organisational and self-developmental process, capable of constantly reifying an organism's life world, for the most part unconsciously, through 'objects' in its life world environment.

However, the project was also about consciously self-developing through interrogating an object of enduring fascination, that is, the bacterial yeast cell symbiosis through developing skin-like pellicles in a glass vitrine in my studio. I argue that, through an intense praxis of grappling with the associations embedded in the symbiont as 'object', I was able to raise meanings, held captive by the growing symbiont, into conscious awareness.

In ‘aims and objectives’, I noted how contemporary science, is searching for an invisible, self-sustaining chemical network, capable of constructing a boundary, aggregating matter and energy to itself and reproducing itself, while evolving towards ever-increasing efficiency, complexity, and autonomy. I propose that this search has implications for the development of consciousness as a self-developmental process, which to date along with the origins of the universe and the origins of life, remains an unsolved mystery.

Having introduced the reader to how I watched bacterial yeast cell symbiosis self-organise into differing aggregations in a glass vitrine in my studio, and envisioned them as visual correlates for conscious self-development even as I manipulated them, I documented my specific aims and objectives for the project. I did so in order to present how my studio praxis and the theories and methods applied established the means of answering the problem statement and research questions, which were in turn relevant to the creation and projection of a stop-frame video. The video, together with the vitrine, projected ideas about consciousness as self-organising and self-developmental, and the performance was a re-enactment of consciousness or awareness of such self-organisation and self-development, while at the same time a visual expression of embodied feelings of immersion into being itself.

In ‘research design and methodology’, I introduced the reader to Gadamer’s *theoria* and *theoros,* respectively interpreted as contemplation and participation, indicating that I considered this approach appropriate to continuous mediation in my studio praxis. Anecdotal insight into Donna Haraway’s notion of ‘companion species’, and information on practice-based/practice-led research are also presented, while my reasons for positioning the project as a creative-practice-as-research undertaking are discussed.

In ‘central theme of the project’ I introduce relevant insights from early research in the project into Louise Bourgeois’ art making processes, specifically her performance *Destruction of the father, reconstruction of the father.* I do so, to provide apposite information on how consciousness, as a self-developmental feeling process, links with Heidegger’s contention that being-in-the-world is simultaneously being-with-others. This proposition provides links to self-organisation and embodied conscious self-development, realised through “feelings of existence” and/or immersion as a living experience.

I mention how, piece-by-piece, this self-reflexive narrative asks old questions and opens old boxes and indicate that I have done so, not only to question notions of ‘being’, but to highlight humanities enduring quest into the mystical nature of consciousness and its relevance to self-development and the creation of meaning in life. By threading anecdotal information throughout the paragraphs and chapters of the project, I attempted to keep the reader captivated and intrigued.

In the ‘research premise’, I explore complexity theory as a theoretical framework that in this project was used to bind the diverse and at times convoluted insights of the project together. Following this, I introduce the reader to the problem statement and research questions while delineating the scope and limitations of both the practical and theoretical aspects of the project.

In Chapter Two, the literature review is presented as a literal stream of information and I acquaint the reader with my efforts to diverge from a standardized traditional approach, to an approach reminiscent in intention to that of a shopkeeper who shuffles the contents of aisles/shelves around, in the hope of exposing customers to merchandise they would not otherwise notice. As such, by exposing research from many disciplines, I

have made an attempt to blur the sometimes distinct categorisations between art and science.

Given this, the research explores biology, cell biology, the Oparin-Haldane hypothesis, the Gaia hypothesis, quantum physics, ancient alchemy, bioart, including art works of certain bio artist's. It embraces insights from philosophy, biopolitics, bio philosophy phenomenology and posthuman philosophy, among other insights, while threading Heidegger's significant proposition, that being-in-the-world is simultaneously being-with-others, throughout the discourse. Heidegger's insights are supported by Nancy.

Chapter Three covers the methodology of my studio practice in-depth, and I take the reader step-by-step through the requirements, methods and processes engaged with in my lengthy endeavours to execute the intentions of the problem statement and research questions. I discuss how I photographed a myriad cellular aggregations before choreographing the storyboard for the stop-frame video *Dust from dust* and detail how and why I alchemically designated each phase before performing the video along with the vitrine in the Unisa Gallery in 2018. I also document the many difficulties encountered and the flaws, foibles and shortcomings of the project as a whole.

The Conclusion

The stream of information approach used to document this project is, as stated in the introduction, neither entirely traditional or conventional. The introduction began by justifying how my lengthy introduction to the problem statement and research questions (because it includes the research conducted prior to embarking on my studio praxis) remains necessary to any understanding of how much creative art practice incorporates and integrates theoretical knowledge.

Critical to this understanding was an exploration of Descartes 'cogito ergo sum', a dictum which pronounced thinking as a superior psychological function to feeling, and a dictum, that when arrogated, inaugurated a dualistic model of being-in-the-world-with-others. While difference affords discernment and oppositions such as microscopic/macroscopic, humanities/sciences, masculine/feminine, interior/exterior, visible/invisible, amongst innumerable other oppositions are understandable, this dualistic model of being also propagates subjective oppositions.

Understanding this necessitated that while growing bacterial yeast cells into symbiotic agglutinations in a vitrine in my studio practice, I grapple with some the challenges this dualistic model of being poses to self-organisation and conscious self-development. Having found relevant literature in both the sciences and humanities to support the project, I embarked on an engaged studio praxis, and because research argues that feelings are as significant as thinking is to the physical/bodily nature of psyche, I began exploring uncanny feeling associations in an attempt to uncover how they speak of immersion and *feelings of existence.*

Throughout the process, I remained inspired by Pico's insight about the internal milieu of an individual being, from the first cell to the human body, remaining the most stable four-dimensional context (2002: 304-310) and Robinson and Combs (1995:17) contention about science and spirituality are being brought together, because new research insights suggest that everything is interconnected, and that everything evolves together. However, Marrusich's reference (cited in Hauser, 2008: 13) about "[p]resence and the bubbling mobility of the inner body - complementary to the image of the motionless body" alongside his statement that, "[a]rt is no longer a *representation* but a continuous inner state *presented* before third parties", encouraged me throughout my praxis.

Over time, I came to realise why the quest of every living being is towards homeostasis and/or self-organisation, yet grasped how unfinished homeostasis is, while life remains. While I grew bacterial yeast cells into pellicles to evoke huge swathes of skin in my Master's project, and researched how oppositional psychological dynamics foster discernment and individuation, uncovering also just how imaginal the *psyche* of an individual is, in this project I turned to growing the symbiont and to envisioning the cellular agglutinations visible beneath the forming pellicle, as a parallel for conscious self-development. I then juxtapositioned this parallel alongside ideas of contemporary research that suggest that *psyche* is capable of constructing itself from the primordial ground of being upwards, in the service of its own homeostatic imperative.

While entirely considerate of how ideas embedded in metaphysical traditions have cohesive value for society, the project provided a personal opportunity to straddle a subjective divide and gain new understanding of how opposites are also complements. As such, the engagements of this praxis established renewed awe of *psyche* as a living, biological process, within which we are all immersed all of the time.

I came to these realisations, because the cellular aggregations photographed through the glass of the vitrine provided a self- reflexive mirror supportive of the subjective intentions of the project. So, even while the project began as an attempt to understand notions of self, selfhood and/or subjectivity, somewhere along the way I realised how much the bacterial yeast cell symbiosis had provided an understanding of myself as merely a 'subject-in-process' within the biological and cultural worlds we inhabit, and concluded that recognising this was more significant than solipsistic notions centred entirely on human affairs.

This insight represented a turning point in my art praxis. This is because, as I researched, I became increasingly interested in giving a ‘face’ to bacteria as another strata of interspecies processes which have implications for all of nature, and restorative ecological continuity for life on Earth. It is my hope that the project as a whole will contribute towards this.

Given the research documented and the self-styled alchemical approach engaged with in my studio, I continue to be self-reflexively aware of consciousness as a continuous biological process of subjective becoming, while life, as contemporarily understood, endures. Aware also, that self-organisation possibly equates to adaptation, physiological homeostasis and/or harmonisation, which at times is experienced as *feelings of existence* – arguably akin to variously recorded experiences of immersion into the processes of being itself. As Steven Jones explains it “[p]erhaps […] consciousness is our *experience of being* […] *process”* (cited in Ascott, 1999: 10).

In the central problem question I asked how and in what ways bacterial yeast cells grown in a vitrine in an artist’s studio can be contemplated, manipulated, photographed, choreographed and edited into a stop-frame video, that when performed along with the vitrine representing the artist’s self-reflexive mirror, provoke an idea of the ‘primordial-ness’ of feelings of immersion as a ‘being-in-the-world-with-others’ experience.

While the research processes required by the central problem question and research questions are documented, and a heuristic approach accepted throughout the project, no definitive answers to the enduring question of what consciousness, as a self-organizational, self-developmental process is, are posited. And although questioning is essential to all critical engagement with the world, because I am left to only ponder the rich fabric exposed in the research boxes opened, I ask one more question, apposite

to the narrative approach adopted throughout. *What if I had not entered into this creative-practice-as-research undertaking?* Curiously, even while this question is perhaps the most subjectively pertinent, I feel assured in my answer cited below:

> I would not have been guided to a more enlightened understanding of 'being', nor experience the solace of the solitude that co-heres in self-conscious awareness. Because "consciousness is solitude, – a solitude that relates to itself outside of itself" (Nancy, 2000: 79). Insights such as these afforded an appreciation of how much the feeling function of conscious self-development informs being-in-the-world-with-others processes - because feelings 'go right down to bedrock, to cellular level, and understanding this led me to an appreciation of just how much 'I am bacteria'. I then realised how, with labour, care (Sorge) and respect for the cellular life I was working with, my praxis had helped decentre anthropocentric notions as I progressively achieved a perspective from which it was possible to create, narrate and perform *Dust from dust: Microorganisms and other tales. An Artist's diary.*

In an 'all-too-human' world (Hird, 2010:37), where everything is evaluated in terms of subjective acquisitiveness, the project afforded an opportunity to grow bacterial yeast cells for little other reason than allow them tell their story – a story simultaneously capable of giving all of us a face, an expression, a disposition. A story that speaks of the rich diversity of life and of the means, the only means, through which human beings live, even thrive. An ancestral story, that precedes personal identity, and a story that might, in the smallest of ways contribute to closing the gap on how 'I', as also 'we', go about restoring nature, because it is our nature.

Needless to say, the afore-mentioned remains my subjective evaluation of the project, as a success or failure, because the insights documented are filtered through my subjective lens, the "movie-in-the-brain", after Damasio. Perhaps individually we are always a unique mix of success and failure and those complex, paradoxical dynamics that permits us differentiate for good or ill as we navigate our individual odysseys. As the comparative

mythologist Campbell (2008: 2) reminds us, “beauty and the beast, stand this afternoon on the corner of forty-second street and fifth avenue[80] waiting for the traffic lights to change.”

Through the processes engaged with, I developed something akin to what Edelman refers to as “conscious of consciousness” and understood how “seeing the duality of body and mind, or the physical and mental, as a feature of the way we have modelled our life-worlds”, as Blakemore refers (both mentioned in the thesis). The journey undertaken was onerous, but through holding fast to subliminal perceptions this intentional, self-developmental odyssey pushed me beyond anthropomorphised and/or anthropocentric understanding of being by expanding my ideas on consciousness as a living, biological, self-organizing and self-developmental dynamic. A dyadic-dynamic that affords for each of us the opportunity to construct subjective meaning, when the whole, which includes our bacterial heritage, is taken into account. Over time, I came to realise how visualizing subliminal perceptions had led my praxis and provided the means for addressing bodily feeling associations experienced from time to time.

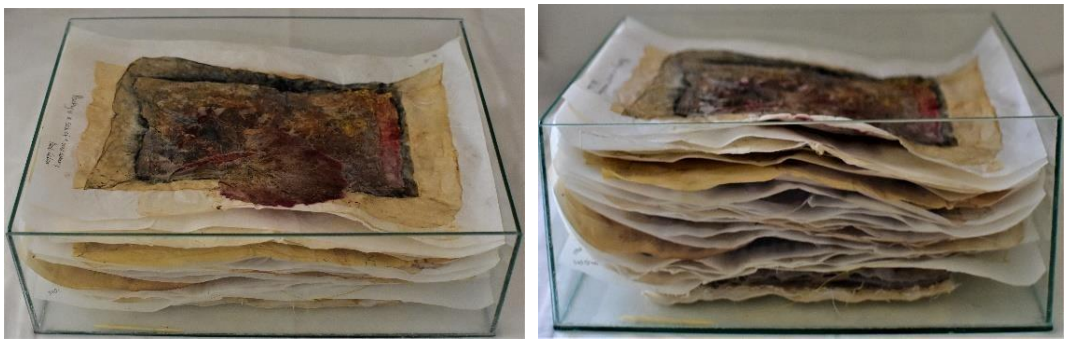


Figure 14. Beverley de Lange. *Hand-made notes in glass container* (2014-2018).

[80] Fifth Avenue in Manhattan, New York is considered one of the grandest, most elegant streets in the world. The corner of Fifth Avenue and Forty-Second street sports an unusual slab of cement into which passers-by carved their initials and messages.

As Hunt reminded me (cited in Hauser, 2008: 61) ‘exciting’ does not begin to touch where we stand in terms of understanding of life and working with it rather than making the best of it”. As such, the winding down of the project represents only the beginning of enduring excursions into ever new and exciting understandings, and for this reason I continued making hand-made notes to document subliminal ideas perceived during the project.

Figure 15. Beverley de Lange. *Hand-made notes* (2014-2018).

I still consider the idea of a live camera feed documenting the activities in the vitrine, but for now the notes serve as visual reminders of the curious feeling experiences generated during the project, because as T.S. Eliot reminds us in “*Little Gidding”*:

> We shall not cease from exploration. And the end of all our exploring will be to arrive where we started and know the place for the first time.[81]

Made from paper, organic material and bacterial yeast cell pellicles, the hand made notes represent multi-layered palimpsests - each holding captive facets of their own mute history. Stored in an open glass container, much like the cells in the vitrine, the notes, like skin, like us, continue to breathe.

[81] See www.columbia.edu/…/winter/w3206/edit/tseliotlittlegidding.html

REFERENCES

Abraham, F.D. 2016. A Beginner's Guide to the Nature and Potentialities of Dynamical and Network Theory in *Human Dynamics* F.F. Orsucci (ed.). New York: Nova Publishers.

Al-Khalili, J. & McFadden, J. 2014. *Life on the Edge: The Coming age of Quantum Biology.* London: Bantam Press.

Allegue, L., Jones. S., Kershaw, B. Piccini, A. (eds) 2009. *Practice-as-Research in Performance and Screen.* New York: Palgrave MacMillan.

Angerer, M. 2011. Feeling the Image: Some critical notes on affect. In *Imagery in the 21st century*, O. Gran (ed.). Cambridge: MIT Press.

Ascott, R. 1999. *Reframing consciousness: Art, mind and technology.* Portland, OR: Intellect Books.

Ascott, R. 2003. Back to Nature II: Art and Technology in the Twenty-First Century. In *The Telematic Embrace: Visionary Theories of Art, Technology and Consciousness,* R. Ascott (ed.). Berkeley, CA: University of California Press.

Asselin, O. Lamarourex, J. Ross, C. 2008. *Precarious Visualities. New Perspectives on Identification in Contemporary Visual Art and Culture*. Montreal: McGill – Queen's University Press.

Barad, K. 2012. *On Touching – The Inhuman That Therefore I Am.* In *A Journal of Feminist Cultural Studies,* 23(3): 206-223. [online] https://read.dukeupress.edu/differences/article-pdf/23/3/206/405804/DIF_23_3_08Barad_Fpp.pdf (Accessed 30 April 2019).

Barnaby, K. & D'Ancierno, P. (Eds.). 1990. *C.G. Jung and the Humanities: Towards a Hermeneutics of culture*. London: Routledge.

Barthes, R. 1977. *Introduction to the Structuralist Analysis of Narratives* In *Image, Music, Text.* trans. Stephen Heath. New York: Hill and Wang.

Blackwell, M. J. 1999. Strindberg's Early Dramas and Lacan's "Law of the Father". *Scandinavian Studies,* 71(3): 311-324 [online] http://www.jstor.org/stable/40920150 (Accessed December 2013).

Blakemore, S.J. 2017. *Seeing myself.* London: Robinson.

Bobrowska, E. 2018. *Participation in the Present and the spacing of Time. On Kawara, Nancy, Levinas*. *Art Inquiry: Recherches sur les arts* XX [online] https://doi.org/10.26485/AI/2018/20/4 (Accessed May 2019).

Braidotti, R. 2013. *The Posthuman*. Cambridge, MA: Polity Press.

Brogan, W. 2010. The Parting of Being: On Creation and Sharing in Nancy's Political Ontology. In *Research in Phenomenology,* 40: 295-308. [online] http://doi:10.1163/156916410X524420 (Accessed May 2019).

Bütz, M.R. Emergence in Neurological Positivism and the Algorithm of Number in Analytical Psychology In *Applied Chaos Theory A Paradigm for Complexity.* Cambel, A.B. 1995. San Diego: Academic Press Inc.

Cambel, A.B. 1993. *A paradigm for Complexity.* San Diego: Academic Press, Inc.

Campbell, J. 2008. *The hero with a thousand faces.* Navoto: New World Library.

Candy, L. 2006. *Practice Based Research: A Guide*. [online] http://www.creativityandcognition.com (Accessed May 2019).

Capra, F. & Luisi, P.L. 2014. *The Systems View of Life: A Unifying Vision.*

Cambridge MA: Cambridge University Press.

Cassim, L. 2015. *Postgraduate Toolkit* (2nd Ed). [DVD]. Layla Cassim ERS Consultants CC.

Catts, O. & Zurr, I. n.d. *Towards a new Class of Being: The Extended Body* [online] https://transvergence.catts_zurr.extendedbody.01 (Accessed July 2019).

Churton, T. 2005. *Gnostic Philosophy: From Ancient Persia to Modern Times.* Rochester: Inner Traditions.

Cirlot, J.E. 2002. *A Dictionary of symbols.* New York: Dover Publications, Inc.

Currivan, J. 2017. *The Cosmic Hologram: In-formation at the Center of Creation.* Rochester: Inner Traditions.

Damasio, A. 1994. *Descartes Error. Emotion, reason, and the Human Brain.* London: Vintage Books.

Damasio, A. 1999. *The Feeling Of What Happens: body, emotion and the making of consciousness.* London: Vintage Books.

Damasio, A. 2010. *Self comes to Mind: Constructing the conscious brain*. London: Vintage Books.

Damasio, A. 2018. *The strange order of things: Life, Feeling and the Making of Cultures.* New York: Pantheon Books.

Davey, N. 2006. Art and Theoria. In *Thinking through Art*: *Reflections on art as research*, K. Macleod & L. Holdridge (eds.). New York: Routledge: 20-25.

Davis, J. 1996. Microvenus. In *Contemporary Art and the Genetic Code 55 (1): 70-74* [online] https://doi:10.2307/777811 (Accessed June 2019).

de Beauvoir, S, 2019. [online] https://www.thegaurdian.com/books/2019/aug/20/was-simone-de-beauvoir-as-feminist-as-we-thought (Accessed November 2019).

Delafield, J. T. & Trevarthen, C. 2015. The ontogenesis of Narrative: From Moving to Meaning. *Frontiers in Psychology*, 6: 1157. [online] www.frontiersin.org (Accessed June 2019).

Dennett, D. C. 1993. *Consciousness explained.* London: Little, Brown and Co.

Deronne, W.A. 1976. *Merleau-Ponty's Philosophy as a Phenomenology of world.* Unpublished PhD thesis, De Paul University, Chicago.

Descartes, R. 1967. *The Philosophical Works of Descartes.* Vol. ll, Trans. E.S. Haldane, G.R.T. Ross. London: Cambridge University Press.

Descartes, R. 1968. *The Philosophical Works of Descartes.* Vol. l, Trans. E.S. Haldane, G.R.T. Ross. London: Cambridge University Press.

Devisch, I. 2011. Doing Justice to Existence: Jean-Luc Nancy and 'The size of Humanity'. *Law and Critique,* 22(1): 1-13. (Accessed June 2019).

Dixon, D.P. 2009. Creating the Semi-Living: On Politics, Aesthetics and the More-than-Human. In *Transactions of the Institute of British Geographers*, *New Series,* 34(4):411-425 [Online] http:///www.jstor.org/stable/40270728 (Accessed May 2015).

Dourley, J. 2011. Jung's equation of the ground of being with the ground of psyche. *Journal of Analytical Psychology,* 56:514-531 (Accessed May 2019).

Drob, S. L. 2018. *Archetype of the Absolute: The Unity of Opposites in Mysticism, Philosophy, and Psychology* in *Never-Ending Creatura,* a book review by Leslie A. Stein 2019. [online] https://doi.org/10.1080/19342039.2019.1560816 (Accessed May 2019).

Edelman, G.M. 1989. *The Remembered Present: A biological Theory of Consciousness.* New York: Basic Books Inc.

Edinger, E.F. 1996. *The Aion Lectures: Exploring the Self in C.G. Jung's Aion.* Toronto: Inner City Books.

Ellis, C. 2017. Chora/Chöros: Samuel R. Delaney and the Masculine Semiotic in Through the Valley of the Nest of Spiders (2012). *Journal of Gender Studies,* 26 (4): 446-461 [online] https://doi/10.1080/09589236.2015.1116982 (Accessed, May 2019).

Ferguson, M. Salter, M. Stallworthy, J. 1996. *The Norton Anthology of Poetry* (4th Edition). New York: W.W. Norton and Company.

Fernandes, C.R. 2018. *Art Made With Kombucha Explores the Science of the Microbiome.* [online] https://labiotech.eu/bioart/kombucha-microbiome-bioart-alanna-lynch/ (Accessed 4 August 2019).

Fielding, H. 1996. *Grounding Agency in Depth:* The Implications of Merleau Ponty's Thought for the Politics of Feminism in *Human Studies*, 19(2):175-184. [online] http://www.jstor.org/stable/20011103 (Accessed 25 May 2013).

Frey, G. 1992. I've got mine. *Strange Weather.* Snowmass: Mad Dog Ranch.

Gadamer, H. G. 1981. *Science in the Age of Reason.* Trans. F.G. Lawrence). Cambridge: MA. MIT Press.

Gallagher, S. 2007. *Phenomenological approaches to Consciousness* in Max Velmanns (ed.) The Blackwell Companion to Consciousness (686-696). Oxford: Blackwell.

Gaustello, S.J. Koopmans, M. Pincus, D. 2009. *Chaos and Complexity in Psychology. The theory of Nonlinear Dynamical Systems.* Cambridge: MA. Cambridge University Press.

Gerber, S. J. van der Merwe, W.L. 2017. On the Paradox of the Political/transcendence and eschatology: Transimmanence and the promise of Love in Jean-Luc Nancy. *Religions 8(28)* [online] https://doi:10.3390/rel8020028 (Accessed May 2019).

Glynn, S. 2005. The Atomistic Self versus the Holistic Self in Structural Relation to the other In *Human Studies* 28(4):363-374 [online] https://www.jstor.org/stable/27642722 (Accessed June 2019).

Gordon, R. 1993. *Bridges: Metaphor for Psychic Processes*. London: Karnac Books.

Grayling, A.C. 2010. *Ideas that Matter: A personal Guide for the 21st Century*. London: Orion Books Ltd.

Grau, O. 2011. *Imagery in the 21st Century*. Cambridge: MIT Press.

Gribbin, J. 2004. *Deep Simplicity, Chaos, Complexity and the Emergence of Life.* London: Penguin Books.

Grosz, E. 2008. *Chaos, Territory, Art. Deleuze and the framing of the Earth.* New York: Columbia University Press.

Haigh, M. 2014. Gaia: “Thinking like a Planet” as transformative learning In *Journal of Geography in Higher Education. 38(1):49-68* [online] http://dx.doi.org/10.1080/03098265.2012.763161 (Accessed May 2019).

Hamerhoff, S.R., Kaszniak, A.W. & Scott, A.C. 1998. *Towards a Science of Consciousness ll. The second Tucson Discussions and Debates*. Cambridge: MIT Press.

Harris, A. 2019. *Conscious. A brief Guide to the Fundamental Mystery of the Mind.* New York: Harper Collins.

Harris, S. 2015. *Waking Up: Searching for spirituality without religion.* London: Black Swan.

Harold, F. 2014. *In search of Cell History.* Chicago: Chicago University Press.

Hauser, J. 2008. *Sk-Interfaces: Exploding Borders – creating membranes in art, technology and Society*. Liverpool: Liverpool University Press.

Hawkins, D. 2012. *Power vs. Force. The Hidden Determinants of Human Behaviour.* Johannesburg: Hay House, Inc.

Hebb, D. 1949. *The Organization of Behaviour.* New York: Wiley.

Heidegger, M. 2010. *Being and Time.* Albany: State University of New York Press. (trans. Joan Stambaugh).

Henderson, J. 2005. *Thresholds of Initiation.* Wilmette: Chiron Publications.

Hird, M. 2010. Meeting with the microcosmos*. Environment and Planning D: Society and Space*, 28:36-39. (Accessed May 2019).

Hsieh, L. 2008. *Interpellated by affect: The move to the Political in Brian Massumi's Parables for the Virtual and Eve Sedgwick's Touching Feeling* [online] doi:101057/sub.2008.14 (Accessed July 2019).

Jacobi, J. 1968. *The Psychology of C. J. Jung.* London: Routledge.

Johnson, M. 2006. *Mind Incarnate: From Dewey to Damasio.* Daedalus, 135(3): 46-54. [online] http://www.jstor.org/stable/20028051 (Accessed May 2013).

Jung. C.G. 1959. *The Archtypes of the Collective Unconscious.* London: Routledge (trans. R.F.C. Hull).

Jung, C.G. 1962. *Psychological Types.* New York: Pantheon Books (trans. R.F.C. Hull).

Jung, C.G. 1967. *Alchemical Studies*. Princeton, NJ: Princeton University Press (trans. R.F.C. Hull).

Jung, C.G. 1968. *Psychology and Alchemy.* Princeton NJ. Princeton University Press (trans. R.F.C. Hull).

Jung, C.G. 1976. *Symbols of Transformation.* Princeton, NJ: Princeton University Press (trans. R.F.C. Hull).

Jung, C.G. 1977. *Mysterium Coniunctionis.* Princeton, NJ: Princeton University Press (trans. R.F.C. Hull).

Jung, C.G. 1980. *Psychology and Alchemy*. Princeton, NJ: Princeton University Press (trans. R.F.C. Hull).

Kalenberg, A. 2008: *Eduardo Kac: The Artist as Demiurge.* In Artnexus 7 No69 90-94.

Kac, E. 2011. Bioart: Genesis to the Natural History of the Enigma. In *Imagery in the 21st Century,* edited by O. Grau. Cambridge, MA: MIT Press.

Kac, E. 2007. Signs of life. *Bio Art and Beyond.* Cambridge, MA: MIT Press.

Kastinger Riley, H.M. 2003. *GOING beyond the Pairs: The Coincidence of Opposites in German Romanticism, Zen, and Deconstruction by Dennis McCort.* Review in Colloquia Germanica, 36(2):192-193. [online] https://www.jstor.org/stable/23983100 (Accessed June 2019).

Kauffman, S. 2014. Cosmos and History: *In The Journal of Natural and Social Philosophy. 10(1).* [online] www.cosmosandhistory.org (Accessed May 2019).

Kauffman, S.A. 2015. Beyond Descartes and Newton: *Progress in Biophysics and Molecular Biology.* 119(3):219-244 [online], Available: file:///C:/users/Bev/desktop/UNISA2019/BeyondDescartesandNewton_Recoveringlifeandhumanity-ScienceDirect.html (Accessed July 2019).

Krajewska, A.U. 2014. Bioculturalism, simulation and satire: The case of S1mOne. PhD thesis, Unisa, Pretoria. (Accessed June 2018).

Krajewska, A.U. 2017. *The Antropocene shifts in Visual Arts: A Case against Antropocentrism. De Arte.* 52(2-3): 29-53 [online] https://doi:10.1080/00043389.2017.13332504 (Accessed June 2019).

Lane, N. 2015. *The Vital Question: Energy, Evolution, and the Origins of Complex Life*. New York: W.W. Norton & Company.

Lapworth, A. 2015. Habit, art, and the plasticity of the subject: The ontogenetic shock of the bioart encounter. *Cultural Geographies, 22*(1):85-102 [online] https://doi:10.1177/1474474013491926 (Accessed July 2019).

Law-Viljoen, B. 2008: *Dis-Location/re-Location. Exploring Alienation and Identity in South Africa.* Johannesburg: David Krut Publishing.

Leder, D. 1990. Flesh and Blood: A proposed Supplement to Merleau-Ponty *Human Studies* 13(3): 209-219 [online] http://www.jstor.org/stable/20009095 (Accessed September 2012).

Lockwood, M. 1998. The Enigma of Sentience. In *Towards a Science of Consciousness 11 (The second Tucson Discussions and Debates)* S.R. Hamerhoff, A.W. Kaszniak & A.C. Scott (eds.). Cambridge, MA: MIT Press.

Logue, C. 1981. Ode to the dodo: Poems from 1953 to 1978. London: J. Cape.

Lovelock, J. 2003. The Living Earth In *Nature,* 426:769-770 [online] www.nature.com/nature (Accessed May 2019).

Lynch, A. 2018. In *Art made from Kombucha Explores the Science of the Microbiome* [online] https://labiotech.eu/bioart/kombucha-microbiome-bioart-alanna-lynch/ (Accessed August 2019).

Lyotard, J.F. 2004. Anamnesis: Of the Visible. *Theory, Culture & Society,* 21(1):107-119.

Macleod, K. & Holdridge, L. 2006. *Thinking through Art: Reflections on art as research*. New York: Routledge.

Mäkelä, M. 2007. Knowing Through Making: The Role of the Artifact in Practice led Research. *Knowledge, Technology and Policy*, 20(3):157-163.

Mäkelä, M. & Nimkulrat. N. 2018. Documentation as a practice-led tool for reflection on experiential knowledge. *Arts.* 11(2): 1-16 [Online], available: https://doi.org/10.7577/formakademisk.1818 (Accessed May 2019).

Marieb, E. 1998. *Human Anatomy & Physiology* (Fourth Ed.). San Francisco, CA: Benjamin Cummings.

Maturana, H.R. & Varela, F.J. 1992. *The Tree of Knowledge*: *The biological roots of human understanding*. Boston, MA: Shambhala Publications.

McAfee, N. 2004. *Julia Kristeva.* London: Routledge. Taylor & Francis Group.

Merleau-Ponty, M. 2004. *The World of Perception.* New York: Routledge.

Merleau-Ponty, M. in *Merleau-Ponty's Philosophy as a Phenomenology of world.* Deronne, W.A. 1976. PhD thesis, De Paul University, Chicago.

Mills, D. 2015. Review of Thought in the act: Passages in the ecology of experience. *Contemporary Political Theory.* 14(4): e22-e24 [online] https://0-link.springer.com.wam.seals.ac.za/article/10.1057%2Fcpt.2014.62

Mitchell, R. 2010. *Bioart and the Vitality of Media.* Seattle, WA: University of Washington Press.

Mondal, P. 2017. *Origin of Life: Modern Theory of Origin of Life.* [online] https://www.yourarticlelibrary.com/biology/origin-of-life-modern-theory-of-origin-of-life/13266/ (Accessed May 2019).

Mooney, J. 2006. In *Thinking through Art: Reflections on Art* as *Research.* New York: Routledge.

Morton, T. 2010. *The Ecological thought.* Cambridge: Harvard University Press.

Mouton, J. 2001. *How to suceed in your master's and doctoral studies: A South African guide and resource book.* Pretoria: Van Schaik.

Nancy. J. 1993. *The Birth to Presence.* Trans. B. Holmes & others. Stanford: Stanford University Press.

Nancy, J. 2000. *Being Singular Plural.* Trans. R.D. Richardson & A. E. O'Bryne. Stanford: Stanford University Press.

Nancy, J. The Being-with of being-there In *Cont Phil Rev (2008) 41: 1-15* [online] https://doi10.1007/s11007-007-09071-4 (Accessed June 2019).

Neumann, E. 1971. *Art and the Creative Unconscious*. Princeton: Princeton University Press.

Neumann, E. 1973. *The Origins and History of Consciousness.* Princeton: Princeton University Press.

Nielsen, L. 1998. *Modeling Creativity: Taking the Evidence Seriously*. In Towards a Science of Consciousness 11 (The second Tucson Discussions and Debates) edited by S.R. Hamerhoff, A.W. Kaszniak & A.C. Scott. *Cambridge*, MA: MIT Press.

Ogle, M. 2014. Stories to live by. *Taproot,* 23(1):17-25 [online] www.entrepreneurialearth.com (Accessed May 2019).

Oliver, K. 1997. *The Portable Kristeva.* New York: Colombia University Press.

Osthoff, S. n.d. *Invisible in plain sight, and as alive as you and I.* An interview with Eduardo Kac [online] http://scholar.google.co.za/scholar?q=eduardo+kac+%2B+flusser+studies&b+nG=&h1=en&as_sdt+0%2cs (Accessed September 2015).

Orsucci, F. F. 2016. *Human Dynamics: A Complexity Science Open Handbook.* New York: Nova Science Publishers, Inc.

Palmieri, D. 2008. *The refractory world of Elizabeth Bishop. Voegelin's theory of Consciousness.* [Online] Available: https://sites01.1su.edu/faculty/voegelin/wp-content/upload/sites/80/2015/09/david-palmieri.pdf (Accessed July 2019).

Pandarakalam, J.P. n.d. Review of *Penrose, R. Hamerhoff, S. Kak,* 2011 *Consciousness and the Universe: Quantum Physics, Evolution, Brain & Mind,* Cambridge: Cosmology Science Publishers (Accessed October, 2019).

Parry, J.D. 2011. *Art and Phenomenology.* New York: Routledge.

Patton, P. 2010. *Deleusian Concepts. Philosophy, Colonization, Politics.* Stanford: Stanford University Press.

Perez, G.G. 2013. Heidegger and Merleau-Ponty: Art and the Bodily Emergence of Meaning. *Studia Philosphiae Christianae UKSW*, 49(2013):4. (Accessed May 2019).

Pico, R.M. 2002. *Consciousness in Four Dimensions: Biological relativity and the origins of thought*. New York: R.R. Donnelley & Sons.

Pigluicci, M. 2013. Why Gaia. *Review of Michael Ruse's Why Gaia: Science on a Pagan Planet.* Chicago: Chicago University Press.

Potts, G. H. 2003. Imagining Gaia: Perspectives & Prospects on Gaia, Science & Religion In *Ecotheology,* 8(1):30-49 (Acessed May 2019).

Ramachandran, V.S. 2004. *A brief tour of Human Consciousness: From impostor poodles to purple numbers.* New York: PI Press.

Ratcliffe, M. 2002. *Heidegger's attunement and the neuropsychology of emotion*. *Phenomenology and the Cognitive Sciences*, 1: 287-312. (Accessed May 2019).

Rathkopf, C. 2017. *Mental Evolution: A Review of Daniel Dennett's From Bacteria to Bach and Back.* [online] http://philsci-archive.pitt.edu/id/eprint/13293 (Accessed October 2019).

Reason, M. 2006. *Documentation, Disappearance and the Representation of live Performance.* New York: Palgrave MacMillan.

Robertson, R & Combs, A. 1995. *Chaos theory in Psychology and the Life Sciences.* Mahwah: Lawrence Eribaum Associates Inc.

Schnieder, S.H. 1990. Debating Gaia In *Environment* 32:(4) 5-7 (Accessed May 2019).

Schrodinger, E. 1967. *What is life? The physical aspect of the Living Cell & Mind and Matter.* Cambridge: Cambridge University Press.

Shusterman, R. 2006. Thinking through the Body, Educating for the Humanities: A Plea for the Somaesthetics. *Journal of Aesthetic Education*,

40(1):1-2 [online] http://www.jstor.org/stable/4140215 (Accessed September 2012).

Silverman, K. 2009. *Flesh of my Flesh.* Redwood City, CA: Stanford University Press.

Stafford, B.M. 2007. *Echo Objects: The Cognitive Work of Images.* Chicago, IL: University of Chicago Press.

Stapp, H.P. 1998. *The Evolution of Consciousness*. In *Towards a Science of Consciousness 11 (The second Tucson Discussions and Debates)* (eds.) S. Hamerhoff, A. Kaszniak, A.C. Scott. Cambridge, MIT Press.

Stedman's Medical Dictionary. 1990. 25th Edition. *Sv 'introjection', 'projection'.* Phildelphia, PA: Williams & Wilkins.

Stein, L. 2019. Review of Sanford Drob's *Archetype of the Absolute: The Unity of Opposites in Mysticism, Philosophy, and Psychology* in *Never-Ending Creatura* [online] https://doi.org/10.1080/19342039.2019.1560816 (Accessed May 2019).

Sullivan, G. 2005. *Art Practice as Research.* London: Sage Publications.

Sullivan, G. 2010. *Art Practice as Research*. London: Sage Publications Second Edition.

Sutton, D. Martin-Jones, D. 2008. *Deleuze Reframed.* London: IB Taurus & Co. Ltd.

Thompson, E. 2007. *Mind in Life: Biology, phenomenology, and the sciences of mind.* Cambridge, MA: The Belknap Press of Harvard University Press.

Thomson, S. n.d. *Kombucha Green Tea Symbiont: A Scientific Health Literature Review* [online] www.gaiaresearch.co.za/kombucha.html (Accessed October, 2019).

Torey, Z. 2009. *The Crucible of Consciousness: An integrated Theory of Mind and Brain*. Cambridge, MA: MIT Press.

Trevarthen, C. & Delafield-Butt, J. 2017. *Development of Consciousness.* In B. Hopkins, E. Geangu, & S. Linkenauger (Eds.), Cambridge Encyclopaedia of Child Development. 2nd Edition. (pp.821 – 835). Cambridge: Cambridge University press. [online]

http://www.campbridge.org/gb/academic/subjects/psychology/developmental-psychology/cambridge-encyclopedia-child-development-2nd-edition?format=HB#1QF7eZgdHUE4AE6D.97 (Accessed July 2019).

Turney, J. 2005. Gaia: Nice is not enough In *Interdisciplinary Science Reviews,* 30(1) 5-10 [online] doi10.1179/030801805X19717(Accessed May 2019).

Van den Hengel. L. 2012. Zoegraphy: Per/forming Posthuman Lives, *Biography* 35(1):1-20

Voegelin, E. n.d. [online] www.evs.ugent.be/node/391 (Accessed 23July 2019).

Von Franz, M.L. 1980. *Alchemy: An introduction to the symbolism and the psychology*. Toronto: Inner City.

Welsch, R. & Panelli,R. 2007. Questioning Community as a collective antidote to fear: Jean-Luc Nancy's 'singularity' and 'being singular plural' In *Area 39(3): 349-356* (Accessed June 2019).

Weisberg, J. 2014. *Consciousness*. Cambridge, MA: Polity Press.

Weiss, A. S. 1981. Merleau-Ponty's Concept of the "Flesh" as Libido Theory, *Substance,* 10 (1): 85-95 [online] https://www.jstor.org/stable/3684399 (Accessed September 2012).

West, D. 1996. *An Introduction to Continental Philosophy*. Cambridge, MA: Polity Press.

Whitehead, D. NA. *Artist's labor.* [online], Available: www.contempaesthetics.org/newvolume/pages/article.php?articleID=466 (Accessed July 2019).

Wider, K. 1997. *The Bodily Nature of Consciousness.* New York: Cornell University.

Yetisen, A.K. Davis, J. Coskun, A.F. Church, G.M. & Seok, H.Y. 2015. *Bioart.* In *Trends in Biotechnology,* 33(12) [online] http://dx.doi.org/10.1016/j.tibtech.2015.09.011 (Accessed May 2019).

Zahavi, D. 1999. *Complexities in the First-Person Perspective*. Reviewed by Sean Gallagher in *Research into Phenomenology,* 32: 238-248 [online] https://www.jstor.org/stable/24659237 (Accessed May 2019).

Zurr, I. & Catts, O. n.d. *The ethical claims of Bio Art: killing the other or self-cannibalism?* [online] Available http://www.symbiotica.uwa.edu.au (Accessed July 2019).